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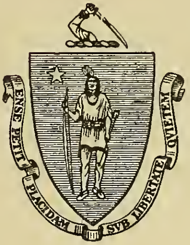
Vol. 27

THE COMMONHEALTH

Volume 27
No. 1

January - June
1940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MASSACHUSETTS
DEPARTMENT OF PUBLIC HEALTH

[1941]

THE COMMONHEALTH

QUARTERLY BULLETIN OF THE MASSACHUSETTS DEPARTMENT OF PUBLIC HEALTH

M. LUISE DIEZ, M.D., DIRECTOR OF DIVISION OF CHILD HYGIENE, EDITOR.
1 Beacon Street, Boston, Mass.

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1942-44
(vol. 27, 28 & 2 suppl. nos.)

MASSACHUSETTS WATER SUPPLIES*

ARTHUR D. WESTON, *Chief Engineer*
Division of Sanitary Engineering
Massachusetts Department of Public Health

Massachusetts is only some 150 miles long, 50 miles wide and has a net land area of only 7,876 square miles but the topographical and geological conditions of the State make it well adapted for purposes of public water supply.

If one were to examine a relief map of the State, he would see three belts of highland and four of lowland sloping generally in a southerly and easterly direction and that the State is drained by two great rivers, the Connecticut and the Merrimack, and by many smaller streams. In most cases the streams flow in a southerly direction through the State, but the Merrimack, which enters Massachusetts from the north, flows in an easterly direction entering the Atlantic Ocean near the New Hampshire boundary. Even this river, however, according to our geological records had its original course in a southerly direction with an outlet in Boston Harbor. There are three main divides between the different river systems of the State. One of these extends nearly through the middle of the State and divides it roughly in half, and the second, which is parallel to it, crosses the State about 10 to 15 miles from the westerly boundary. Between these two divides lies the Connecticut river basin. A third divide, which cuts the eastern half of the State into nearly equal parts, has an average westerly course from the sea to the Connecticut Valley and separates those streams which flow directly into Long Island Sound from those that enter the Connecticut River and those that flow northeastward into the Atlantic Ocean. The geologists explain to us that each highland or upland is due to the prevalence in it of rocks that are hard and resist the wear of streams and weather, and in contrast each lowland is due mainly to the presence of rocks that are weak and yield most readily to the elements. There are seven topographical districts which have been formed in the State as the results of the geological conditions. These districts named in order from west to east are: the Taconic Range, the Housatonic Valley, the Green Mountain Highlands, the Connecticut Valley, the Central Upland, the Eastern Lowlands and the Coastal Plain. The Taconic Range is located along the westerly border of the State and has its highest summit in Mount Greylock located at an elevation of some 3,500 feet above mean sea level. It contains other high peaks, such as East Mountain, elevation 2,660 feet, and Berlin Mountain, elevation 2,800 feet, and such altitudes as Mount Everett, near the southwest corner of the State, of 2,620 feet above sea level.

The Housatonic Valley has an elevation of some 1,100 feet above mean sea level at the head of the Housatonic and Hoosick River valleys and an elevation of 570 feet above mean sea level at the boundary between Massachusetts and Connecticut, while in the middle of this valley there are such mountains as the Lenox Mountain, 2,150 feet, and Tom Ball Mountain, some 1,900 feet, above sea level.

The Green Mountain Highlands include the Berkshire Hills which rise above the Housatonic Valley on the west and the Connecticut Valley on the east and consist of a plateau belt of lands about 25 miles wide extending southerly across the State. The northwesterly part contains the Hoosac Mountain, near the Vermont boundary, one of the most prominent high points of land in the State, which has an elevation of about 2,800 feet. In the western part of this highland, in Berkshire County, is what is known as the Berkshire Hills. About one-half of these highlands is more than 1,500 feet above the sea, and much of the area is higher than 2,000 feet above sea level.

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* Read before the Engineering Society of Western Massachusetts, Springfield, Mass.

The Connecticut Valley, which lies to the east of the Green Mountain Highlands, is roughly triangular and is about four miles wide at the northerly boundary of the State, and 20 miles wide at the southerly boundary. This valley includes the Chicopee and Millers rivers, tributaries of the Connecticut River, on the east, and Deerfield and Westfield rivers on the west. The Connecticut River enters the State at an elevation 180 feet above sea level and leaves the State 67 miles downstream at an elevation of 42 feet above sea level. There are ranges in this valley, for example the Holyoke Range, which has a summit in Mount Tom of over 1,200 feet, and Mount Nonotuck about 1,100 feet above mean sea level; while there are many rolling hills around its margin with heights of 500 to 650 feet and of 300 to 340 feet above mean sea level. The greater part of this valley is less than 300 feet above mean sea level, with large areas at as low as 125 feet above M.S.L.

East of the Connecticut Valley is what is known as the Central Upland which includes the high part of the State between the Connecticut River Valley and the lowlands in eastern Massachusetts. This belt is about 34 miles wide at the north and 20 miles wide along the Connecticut border. Because of these topographical conditions, the land area of the State varies in height from tidal water in the easterly part of the State to some 3,500 feet above sea level in the westerly part. These conditions have a very favorable controlling influence upon the character of the sources selected for municipal water supplies and upon the quality of their waters.

It has been estimated that there are in Massachusetts 1,215 "Great Ponds," so called, natural bodies of water having areas of 10 acres or more of which 129, or 26.4% are used for water supply purposes. The most desirable sources of water supply are in these ponds and natural lakes scattered over the entire territory of the State and it is from such sources that some of the purest and most excellent waters for public supply are available. It was to these lakes and ponds that municipalities which first established municipal water supplies naturally turned for their sources of supply, and as early as 1796 the Jamaica Pond Aqueduct Corporation took advantage of one of these bodies of water known as Jamaica Pond in Roxbury and developed it as one of the first sources of water supply of the city of Boston, the first source having been established in 1652 when a small reservoir or cistern was located near the corner of Elm and Union Streets in Boston.

All of New England is a region of crystalline rocks which do not yield water readily. Consequently, those municipalities which have not found it more economical to obtain their supplies from surface sources have generally resorted to the use of wells in glacial drifts. These supplies are located chiefly in the easterly part of the State where deep deposits of glacial drift well suited for purposes of ground water supply predominate. Comparatively few municipalities obtain any of their water supplies from deep wells in rock. Such supplies known to this Department are two wells some 200 feet deep used by the town of Avon; two tubular wells located in limestone 550 and 625 feet deep used in the past by the city of North Adams as an auxiliary source of supply and six wells 106 feet deep also located in limestone used by the Adams Fire District as an auxiliary source of supply.

Up to 1885, there was no agency in Massachusetts which had the oversight of our inland waters and when public water supplies were first introduced it was common practice to dispose of sewage in the nearest stream regardless of the effect on the public health of those using the stream below the point of discharge. Conditions at that time were so bad that the Legislature appointed a Special Commission, known as the Massachusetts Drainage Commission, to investigate matters of water supply, sewerage and drainage not only in certain river valleys in the easterly part of the State but also throughout the State as a whole. This Commission reported under date of December 24, 1885, and pointed out that the only laws in existence at that time which could be considered at all effective in preventing pollution of our public water supplies were those which related to bathing in such supplies and which prevented the driving of animals upon the ice of any pond, lake or reservoir used as a source of water supply. Obviously, these laws did not afford ample protection to the public health and typhoid fever was prevalent resulting annually in over 1,000 deaths. As a result of the recommendations of this Commission, a law was passed in 1886, which was further amended in 1888, giving the Department of Public Health not only the general oversight of inland waters but made it the duty of the Department to advise officers of towns and persons relative to their proposed systems of water supply, drainage and sewerage, as to the most appropriate source of water supply and the best method of assuring its purity, and also as to the best method of disposing of drainage and sewage, having in mind the existing and future needs of other towns and persons. This law went even further and made it mandatory for the Department to consult with and advise persons engaged in manufacturing or other business whose drainage or sewage might tend to pollute any inland water and authorized the Department to conduct experiments to determine the best method of purification or disposal of drainage or sewage.

Under this law all towns and persons are obliged to submit to the Department their proposed plans for systems of water supply and disposal of drainage and sewage, and all petitions to the Legislature for authority to introduce systems of water supply, drainage or sewage must be accompanied by a copy of the recommendations and advice of the Department thereon. Following the enactment of these laws, an Engineering Division and Water and Sewage Laboratories were established by the then State Board of Health in 1886 and an Experiment Station was established in the city of Lawrence on the banks of the Merrimack River in 1887. The Engineering Division, Water and Sewage Laboratories and Experiment Station, combined into one division known as the Division of Sanitary Engineering in 1933, have been busily engaged since that time not only in assisting in advising cities and towns as to the most appropriate sources of water supply and the best methods of drainage and sewage disposal but also through their experiments and investigations have provided ways and means for making water supplies safer for use, for more adequately treating sewage and manufacturing waste and for disposing of such matters without injury to the public health. At the time of the establishment of these divisions in 1887 only about 70% of the population in the State had access to public water supplies. At the present time over 97% of the population of the State is in cities and towns having public water supplies and 85% of this population is in cities and towns having works for the disposal of sewage. In this connection it should be pointed out that the population of the State has increased during this period from 1,942,141 in 1885 to 4,350,910 at the time of the last census in 1935. The typhoid fever death rate has been considerably reduced during this period, the rate of reduction being comparable with the rate of introduction of public water supplies. At the present time instead of having a death rate of about 45 per 100,000 population, this disease has practically disappeared, the death rate in 1939 being but 0.2 per 100,000. This is one of the lowest, if not the lowest, ever recorded in this country.

There are 351 cities and towns in Massachusetts and of this number 255 have public water supplies. All of these supplies are examined at regular intervals by the engineers of the Department, and in addition all sewer outlets and works for the disposal of sewage are examined in order that we may be assured that the sewage is being disposed of in a manner which will not have an unfavorable effect upon the public health.

About 75% of the water supplied, which includes the supplies of most of the large cities, is taken from surface sources where the water is generally stored for long periods of time, under which conditions it is improved in respect to color and bacterial content. These supplies, while somewhat colored, are not similar to the muddy, turbid waters characteristic of other parts of the country. This coloring matter is due to the water coming in contact with leaves and other organic matter somewhat in the same way that color is imparted to water coming in contact with tea. This coloring matter has no unfavorable effect upon health and is bleached out by long periods of storage in the reservoirs. The ground water supplies are generally clear and colorless.

An outstanding characteristic of Massachusetts waters is their softness. Soft water is particularly desirable in public water supplies; first, because of its value when used for industrial purposes; and second, because of its more satisfactory use for ordinary domestic purposes. In the use of water for industrial purposes, especially in large power plants, water must be as soft as it is practicable to obtain it and in some of the very large power plants steps are taken to reduce even the softest of natural waters by chemical treatment. In most laboratories the hardness of the water is determined by its ability to absorb soap. This soap solution is added to a given quantity of water until a lather appears. A soft water, therefore, means a water which requires less soap and it can be readily understood that a soft water is of high commercial value in certain textile industries and in laundries and hospitals where a large amount of water is consumed.

The only waters of any hardness in Massachusetts worthy of consideration are those obtained from limestone deposits, especially in the westerly part of the State. In comparison with the hard waters supplied in other parts of the country, the water on Marthas Vineyard and Nantucket in this State has a hardness of only about 5 parts per million compared with water having a hardness of nearly 400 parts per million in certain parts of Ohio, 300 parts per million in sections of California, 250 parts per million in portions of the state of Florida and 100 parts per million in such places as Buffalo, Cleveland, Pittsburgh, Detroit, Chicago and Philadelphia. The maximum hardness of Massachusetts water supplies is that of the wells of Adams having a hardness of 131 parts per million and one of the sources of water supply of Williamstown, 170 parts per million and the Lanesborough Village Fire and Water District, 208 parts per million.

It has generally been considered that an ideal water is one that is clear and colorless, soft, low in organic matter and free from objectionable minerals and bacteria and otherwise safe for drinking. Certain bottlers, having spring waters with these characteristics, have advertised their waters extensively. It is interesting to note that analyses of many of the waters supplied through the public supplies in this State show them to be of more satisfactory quality than some of the bottled waters. In fact there are several public supplies where the water is not only clear and colorless but contains very little organic matter and practically no objectionable minerals, while repeated bacterial examinations of these waters have shown them at all times to be safe for drinking without treatment. The water of one of our public supplies has been found so satisfactory that it has at times been bottled and sold in competition with highly advertised bottled water.

Because of the very favorable conditions under which water supplies generally can be obtained in Massachusetts, water is sold to the consumers at very reasonable rates. In most places the water can be obtained in the average home for less than 30 cents a thousand gallons, which is equivalent to only about 7 cents a ton as compared with $12 to $16 a ton paid for coal, over $40 a ton for gasoline, $160 a ton for bread and $600 a ton for meat. The amount paid by the average family for the water supplied is hardly more than that which is paid for the daily newspaper and on an average is less than $20 a year as compared with $30 to $40 a year for electric lights and $36 or more a year for a telephone.

In may municipalities much of the water supplied is for industrial uses because of the even chemical characteristics of the water and the low rate at which the water is sold. Many of the largest consumers, for example manufacturers of woolen and some of the textile manufacturers who require not only soft water but water that is free from objectionable solids and coloring matter for the dyeing of delicate fabrics, may find it necessary to take the water from some neighboring stream and rely upon filtering and other mechanical or chemical treatment to improve its quality.

TASTES AND ODORS IN DRINKING WATERS*

ARTHUR R. G. BOOTH, *Chief of Laboratory*
Division of Sanitary Engineering
Massachusetts Department of Public Health

Most people are interested in the water they drink. As long as it is satisfactory there is no complaint, but let there develop an odor or taste and immediately one becomes suspicious and hesitates to use that water until its safety for drinking has been established. Water for municipalities is obtained either from surface supplies, that is, ponds, lakes or reservoirs, or from ground supplies such as well water. A few supplies may be derived from a mixture of surface and ground waters. In surface supplies, open to the influence of heat, light and air, spores are apt to appear. These come from the dust in the air or from other sources and in the presence of organic matter, either nitrogenous or carbonaceous, develop into plants so small that with very few exceptions they can be seen only by aid of the microscope. These are called microscopic organisms and may be of either plant or animal origin and are scattered throughout the entire body of water. They are divided into classes according to their shape, size, and characteristics and are known as Algae, Fungi, Protozoa, etc. Each of these classes is further divided into numerous specific organisms. Of these growths, each has its particular odor, characteristic of a specific organism. Just as certain flowering plants give rise to certain odors due to the oil which they secrete, such as the rose and the violet, so large quantities of Anabaena when present in reservoirs, impart a marshy or moldy odor to the water; Synura, an odor of ripe cucumber; and Uroglenopsis, an oily odor or that of decayed fish. Many times the consumer is mistaken in thinking that this odor is caused by the actual presence of decayed fish in the reservoir.

There are usually many varieties of organisms growing in a reservoir at the same time. Ordinarily the number present is not sufficient to give a perceptible odor to the water. However, if conditions of temperature and food supply are more favorable for a particular species, it multiplies much more rapidly than the others and if it has a characteristic odor it will soon impart that odor to the water. The odor that these organisms produce is often intensified when they begin to die and decompose or when they are broken up as by flowing through the water mains or when the water is heated. Under these conditions, not only the strength of the odor will increase but its character will change so that, for instance, Anabaena, having a marshy or moldy odor in its living state, will, when it dies and decomposes, impart a strong pigpen odor to the water. Sometimes the odor that a species of organism imparts to the water will not only increase as the number of organisms increase but the character of the odor will undergo a marked change. Thus Asterionella, when only a few of these organisms are present, gives an aromatic or geranium odor, but when the organism has increased in concentration the odor changes to one resembling stale fish. In the summer months the temperature of the water at the bottom of large reservoirs is lower than at the surface and in winter it is higher than at the surface. In spring and fall when the temperature of mid-depth approaches that of the surface and bottom, the whole body of water begins to turn over and with it the bottom organisms are drawn to the surface, and vice versa, and for a short time there is apt to be an increase in the odor of municipal water supplies due to the influx of broken-up organisms and aquatic plants. Odors in surface waters increase in intensity as the temperature of the water increases. Almost everyone is sensitive to the change in the temperature of the water he is accustomed to drink. For instance, water standing in pipes between the walls in large buildings over night becomes heated and acquires a flat taste and at times an unpleasant odor. This same water, however, when chilled would probably be most acceptable to the consumer. Many times when municipal water supplies are drawn from larger reservoirs, the water comes from one of three depths,—surface, mid-depth or bottom. In case of any complaint from water consumers on the pipe lines, regarding tastes and odors which may be due to abnormal growths of microscopic organisms in the reservoir, it can sometimes be rectified by drawing from one of the other levels.

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* Health Forum Release No. 210.

SAFE BUT UNPALATABLE*

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Massachusetts Department of Public Health

Public water supplies were first introduced to insure the communities of a water suitable for domestic uses. The first requisite was that it should be safe for human consumption, that is, it should contain no water-borne disease bacteria. The keynote of public water supplies has always been "safety," and while the purity of the water has always been taken for granted by the public at large they further demand that the water be palatable.

During February, 1932, certain communities of greater Boston supplied with water from Spot Pond, a reservoir on the Metropolitan water system, complained of a very disagreeable odor and taste in the water, a condition which has not been experienced with the Metropolitan supply for a great many years as this supply has always been noted for its purity and palatability. The trouble was immediately recognized by sanitary engineers as caused by the presence of certain microscopic organisms in the water—minute plant and animal life which are present in all surface waters. Microscopical examinations disclosed the presence of the organisms Uroglena, Synura, Dinobryon, and Asterionella. These first three are classified as Protozoa or organisms of animal life, while the organism Asterionella is a blue-green algae or plant life. These organisms produce essential oils which impart a fishy, oily and pungent taste and odor to the water, in some cases even when present in small numbers when they break up or upon decay. Urolgena in small numbers produce an oily, fishy taste and when present in large numbers they impart a taste and odor which resembles cod liver oil. Synura when present in only a few units impart a taste described as cucumber, fishy, musky, etc., and leave a persistent bitter aftertaste. Dinobryon and Asterionella also cause a fishy taste and odor when present in large numbers. These microscopic organisms while producing disagreeable conditions have never been known to be injurious to health.

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* Reprinted from The Commonhealth, Vol. 19, No. 2.

Temperature is probably one of the factors, especially in the time of the starting of the growths of the organisms, and while certain classes of organisms thrive only in warm water Synura and Uroglena prefer a lower temperature and grow under the ice.

The Metropolitan District Commission requested the advice of the State Department of Health on February 23, 1932, relative to the best methods of removing these troublesome organisms and the Department recommended the treatment of the pond with copper sulphate as soon as possible. This method of treatment has proved very satisfactory in various surface water supplies in the State but unfortunately in the case of Spot Pond, which was partly covered with ice when the complaints were first received, it was impracticable to use the proper method of application, which consists of dragging burlap bags containing copper sulphate through the water by means of a power boat, while the thinness of the ice would not permit the application of copper sulphate through holes cut in the ice.

On March 27, the entire pond was treated with copper sulphate, the dosage to kill these objectionable organisms being estimated at 2 pounds per million gallons, and as the capacity of Spot Pond Reservoir is about 1,800 million gallons, approximately 2 tons of copper sulphate were used. The maximum amount of copper in the water after dosing, as shown by chemical analysis, was 0.071 of a part of copper to a million parts of water. From a public health standpoint this amount is infinitesimal, as there is no record of copper in water being injurious to health when present in less than 1.40 parts per million. This treatment completely destroyed the more objectionable organisms in the pond within a few days, but the general improvement was not noticed by the consumers for nearly two weeks because of the time required to remove the previous objectionable water and the accumulations of organisms from the distribution system.

When this disagreeable condition first made itself manifest, the public immediately abandoned the safe although unpalatable public supply and resorted to the practice of securing water from springs and wells, many of which had been unused for years and produced water of questionable quality. Many of these springs and wells used by the public, while apparently producing a desirable water, when examined by the Massachusetts Department of Public Health proved to be unsafe sources of water supply for domestic use, and added to this danger was the practice of using various types of containers and receptacles for transporting the water and the practice of transporting and selling bottled water of questionable quality.

Such experiences with a public water supply and the resulting dangerous practices should serve as a warning to both the public and our water works officials. It should impress the public with the danger of the use of wells and springs furnishing water of questionable quality when the public supply is, in spite of odor and taste, known to be safe for drinking, and to those in charge of our public supplies it is a challenge to so control the factors which affect the palatability of our supplies that the public may be assured of a water palatable as well as safe.

DANGERS FROM WELLS IN ROCK*

Ernest J. Sullivan, *Assistant Sanitary Engineer*
Division of Sanitary Engineering
Massachusetts Department of Public Health

The rock formation underlying the greater portion of New England consists mostly of granite and trap rock, while in the north and northwesterly sections there is some limestone. Water does not pass through granite and trap rock readily, and water obtained in these formations is in pockets and crevices through which the surface water enters, oftentimes from distant points. In the case of limestone, however, water will erode a passage through such a formation. With this information available, it can readily be seen that the possibility of obtaining a good water supply of any large quantity in rock formation is not very encouraging. Nevertheless numerous rock wells have been installed throughout New England. In the construction of such wells it is the general practice to sink a metal casing considerably larger in diameter than the proposed well, extending through the layer of earth which covers the rock, and some 2 to 10 feet into the rock. Another metal casing of slightly larger diameter than the proposed well and slightly smaller diameter than the first casing is then installed inside and extends from 2 to 6 feet above and 10 to 20 feet below the bottom of the first casing. A water-tight seal of concrete or some other plastic compound is then placed between the casings. A hole or shaft of smaller diameter than the inside casing is drilled into the rock until water is obtained. It is not always possible to obtain water of satisfactory quality and quantity, and there are many cases on record where after large expenditures of money, wells drilled to depths of 800 and 900 feet have been abandoned because of the small quantity or the undesirable quality of water obtained.

In most instances, wells are located in depressions of hollows in the rock formation, thus being subjected to any surface drainage which may flow along the surface of the rock.

Many people reason that a rock well is the safest and most desirable method of obtaining a subsurface water supply because they argue that the well consists of a hole or shaft drilled through solid rock and the water obtained is from a considerable distance below the surface of the ground. This method of reasoning is false and misleading because in most instances the drilled hole or shaft is not through solid rock but rock containing numerous crevices and cracks, and the water enters the well through these openings and the theoretical advantage of the seal is lost.

If they are to be used for domestic water supply purposes, wells should never be drilled in the vicinity of ponds or standing bodies of water of questionable quality, if the rock formation forms in whole or in part the bottom of such a body, because any crevices or cracks encountered in the construction of such a well will probably allow some of the polluted water to eventually enter the well. The deeper the well the greater will be the hydraulic pressure from the standing body of water and the danger of contaminating the well.

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* Health Forum Release No. 486.

As stated above, most water entering rock wells reaches them through crevices, cracks and fissures in the rock formation. The water may enter these openings at the surface and thus may reach the well without adequate natural filtration. Rock effects very little purification and any polluted water entering these openings may be of practically the same quality when it enters the well. In most cases it is difficult and sometimes impossible to definitely determine sources of pollution to water obtained from wells of this type. It is, therefore, apparent that the possibility of obtaining a satisfactory water supply from rock wells in this part of the country is limited and the danger of polluted water entering such wells is very great.

WHAT IS A SAFE AND SATISFACTORY WATER FROM A CHEMICAL STANDPOINT?

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Division of Sanitary Engineering
Massachusetts Department of Public Health

From a chemical standpoint a safe and satisfactory water for drinking and culinary purposes should be free from poisonous substances, clear, colorless and odorless, pleasant to the taste and should not contain an excessive amount of soluble mineral substances, nor of any chemicals employed in treatment.

The substances commonly considered poisonous which are most often found in water are salts of the metals lead, copper and perhaps zinc. According to the standards adopted by the Treasury Department, June 20, 1925, for drinking and culinary water supplied to common carriers in interstate commerce, lead should not exceed 0.1 p.p.m., copper 0.2 p.p.m. and zinc 0.5 p.p.m. English authorities set the safe limits for these substances somewhat higher but the Treasury standards are on the safe side and satisfactory for our use.

The Treasury Department standards also require of a water that:

1—Sulphate (SO_4) should not exceed 250 p.p.m.
2—Magnesium (Mg) should not exceed 100 p.p.m.
3—Total Solids should not exceed 1000 p.p.m.
4—Chlorides (Cl) should not exceed 250 p.p.m.
5—Iron (Fe) should not exceed 0.3 p.p.m.

In treated water—there should be:

1—no caustic alkalinity
2—no odor or taste of free chlorine
3—not less than 10 p.p.m. of alkalinity if an aluminum compound has been used as a coagulant
4—not more than 50 p.p.m. of carbonates of sodium and potassium

A safe water must, of course, be free from sewage pollution and a sanitary analysis frequently is of assistance in determining the presence of substances which might make the water unsatisfactory as a beverage. These constituents are not usually in themselves harmful but they may indicate conditions or qualities which are undesirable.

The color is due to dissolved or colloidal matter, usually of vegetable origin, and while it is not usually indicative of pollution, it does make the water unattractive.

A more particular public now demands a water that is without turbidity, color or odor and which has a pleasant taste. A water which is not pleasing to the eye or to the palate is often regarded with suspicion by the consumer and, although the water may be safe bacteriologically, the consumer may prefer to use a supply of doubtful quality but of more attractive appearance and taste.

Although there are only four different tastes; sour, sweet, salt and bitter—many other sensations of taste are observed in water supplies. These are actually odors. Any unpleasant odor such as that from microscopic organisms, hydrogen sulphide or chlorine, should be eliminated.

Turbidity—is usually caused by very finely divided suspended matter; it also is a measure of the attractiveness of water and of the efficiency of filtration.

Hardness—is a measure of the soap consuming power of the water and to a certain extent of its mineral content. In New England hardness should be less than 50 p. p. m. if the water is to be considered suitable for domestic and laundry use. Waters may be considered hard if the value is more than 100 p. p. m. The question as to whether water is hard or soft depends largely upon local opinion; a water considered hard in some localities would undoubtedly be considered soft in others. The alkalinity determination is of particular value in the operation of filtration plants using coagulants. It has little sanitary significance. We may differentiate between bicarbonate, carbonate and hydroxide alkalinity by the proper use of indicators. Whereas the titration of water with a standard acid will measure the total amount of alkalinity present the pH or hydrogen concentration is an intensity factor and measures the active alkalinity and acidity of the water as opposed to the total available or reserve alkalinity. The pH value is of great assistance in controlling the coagulation of water with alum and other coagulants and is also a measure of a corrosive action on metals. Usually, the lower the pH value the more corrosive the water is although other factors may be of more importance in determining the activity of the water.

Dissolved oxygen is present in all surface water used as a water supply and it may or may not be found in ground water. It is one of the principal factors in corrosion and its action is accelerated by the presence of carbon dioxide, particularly in soft waters.

The presence of carbon dioxide tends to increase the ability of water to attack metal. Although it is not the direct cause of corrosion, its accelerates corrosive action by decreasing the pH value and by dissolving protective coating from pipes. The amount of carbon dioxide permissible in a water before corrosion may be expected, depends upon a number of factors, principally its hardness and alkalinity and no definite limit can be set.

Although water in nature is never free from chloride, there is hardly a factor in water analysis which is examined more carefully. In most cases, chloride is present as sodium chloride or common salt, washed from the air or soil or added as one of the constituents of sewage. Salt itself in the quantity usually found is not objectionable but as it is used so commonly in our food, there is always reason for suspecting sewage contamination where the chloride values run high. These chloride values, however, may be misleading in districts where deposits of salt are found or close to the sea where salt water may enter a well. Comparison should be made with a local water of the same general character, known to be pure. The isochlor charts, where available, are valuable. It should be noted that the chlorides are unchanged during the purification or oxidation of organic matters and do not indicate whether the pollution is recent or remote.

Iron is objectionable if present in quantities of 0.3 p.p.m. or more because it causes rust or red water, stains utensils or food in cooking, discolors white goods in laundering and stains plumbing fixtures. The iron particularly in well water may appear only as a slight turbidity. In its worst form, the red turbidity may make the water unfit for any satisfactory use.

Manganese which frequently appears with iron has similar disadvantages and should not be present in a satisfactory water. The limit sometimes set for iron and manganese together is 0.3 p. p. m.

Since fecal matter partially consists of protein matter which contains nitrogen, it is desirable to follow the progress of nitrogen from the fresh organic material through the successive steps of organic decomposition and inorganic oxidation. We can do this in a measure by determining the total organic nitrogen (Kjeldahl) or albuminoid ammonia as representing the nitrogenous organic matter, the free ammonia as representing partially decomposed material and the nitrites and nitrates as stages of oxidation of the nitrogen.

Albuminoid ammonia does not exist as such in water but it is the product of the decomposition of organic nitrogenous substances by alkaline permanganate and bears a variable ratio to the total organic nitrogen in polluted water. In slightly polluted waters, the values obtained are related to color and colloidal matter. The albuminoid ammonia is generally considered with the free ammonia, and according to some authorities, their relative proportion is more important than the actual quantities because in all sewages and most effluents, the amount of free ammonia greatly exceeds that of the albuminoid ammonia. When waters yield more free ammonia than albuminoid ammonia, the indications are that the water is more or less polluted with sewage unless both free and albuminoid ammonia are very low.

The presence of nitrites indicates that organic matter in sewage is undergoing active oxidation or nitrification and that the process is not complete. A water containing even a trace of nitrites must be regarded with suspicion unless some other source is found from which it has more probably been derived. Many waters containing nitrates, if allowed to stand in contact with iron, lead or zinc in pipes or cisterns act upon the metal, the nitrates being in part reduced to nitrites and ammonia. Unless the presence of an inorganic reducing agent is indicated, nitrites must be attributed to the incomplete oxidation of animal matter and the water regarded as dangerous. The absence of nitrites does not indicate that water is safe or satisfactory since many polluted waters do not contain this substance.

Nitrates may be considered the final step in the oxidation of nitrogenous organic matter. Because of the larger amount of nitrogen present in animal matter and because this material is more easily decomposed, nitrates are more apt to indicate decomposition of animal than of vegetable substances. The presence of nitrates does not mean that the water is safe. Sewage bacteria may easily survive for periods longer than required for the nitrification of nitrogenous material. Nitrates in the water may, of course, be derived from mineral deposits.

According to standard methods of water analysis, the oxygen consumed from permanganate by a water that does not contain nitrates, ferrous iron, sulphides and other oxidizable mineral matter, is a partial measure of the organic matter in the sample. The proportion to the total varies greatly and depends upon the chemical composition of the organic matter. Deeply-colored waters although of good sanitary quality, are sure to give high results. In many cases of this kind, a simple inspection for the measurement of color would give equally valuable information.

There is no reason for believing that organic matter itself, for example, in river water would have any more injurious effect than nitrates or chloride from such matter and unless it is present in relatively large amounts, it does not affect the quality of the water any more than the chlorides and nitrates do. The presence of considerable amount of organic material, however, in a raw water especially if it can be determined that it is of animal origin, is a sign of pollution. The chemist can detect in the water no single constituent which, with certainty, indicates the presence of sewage. Recent or remote pollution may be indicated when an excessive amount of chloride, nitrate, ammonia and organic matter is found in the water. Unfortunately, nearly all of these substances may come from other perfectly harmless sources and it is possible for a small amount of sewage to be present without increasing to an appreciable extent the amount of these constituents. Sometimes, waters which appear to be polluted from the results of the chemical analysis come from sources which are practically free from any possibility of contamination. Perhaps, just as often, waters which from the chemical analysis appear to be very pure, come from sources which must be condemned on account of the possibility of pollution.

To sum up this discussion, it should be said that chemical analysis cannot indicate whether a water is absolutely safe for drinking and culinary purposes. It is, however, of great importance when considered along with the bacteriological examination and the sanitary survey. A water can be best judged whether it is safe and satisfactory only after a thorough sanitary survey, a careful bacteriological examination and the chemical analysis. A chemical test has the advantage that it can be carried out quite rapidly as compared to the bacteriological examination and its greatest usefulness is probably in the routine control of water treatment plants.

In the discussion of a satisfactory water its use for industrial purposes cannot be overlooked. When used in the manufacture of any article of food or drink, bacterial purity is essential and the quantity or character of the saline constituents is of secondary importance.

Water used for the preparation of ice must be free from color and suspended solids and contain no metallic impurities such as iron and manganese. The total solid content should be low and the water should be of the same high degree of purity as drinking water.

For making a good quality paper, the water must be free from color and suspended solids and from every trace of iron and manganese. The total solids should be low.

In the manufacture of artificial silk, a clear water, absolutely free from color is required.

For tanning purposes the water should be free from iron and as soft as possible as these substances form insoluble compounds with the tannins.

A most common use is for boiler waters. In this case, the water should be soft, free from suspended solids, low in total solids and carbon dioxide.

In general, the best water for a public supply is the most suitable one for those manufacturers which require a good water. Manufacturers requiring special characteristics in most cases have their own supply or suitable means of treating the public supply and employ a trained chemist to control the quality of water desired.

INTERPRETATION OF BACTERIAL WATER ANALYSES

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The bacteriological determinations which have come to be generally recognized as of the most value in the sanitary examination of water supplies are the following:

1. The number of colonies developing on plates incubated at 20°C. for from two to four days on nutrient agar.
2. The number of colonies developing on plates incubated at 37°C. for twenty-four hours on litmus lactose agar.
3. The quantitative estimation of members of the coli-aerogenes group by gas produced at 37°C. in lactose broth.

The number of colonies is determined by measuring one cubic centimeter of the sample or a decimal fraction thereof into a petri dish or plate, pouring in a tube of melted agar, mixing, and incubating for the stated time. At the end of the incubation there will be, theoretically, a readily visible colony of bacteria on the agar wherever there was an organism in the mixture of agar and water. The count is expressed as the number of bacteria per cubic centimeter of sample taken.

Most of the bacteria developing on the plates at 20°C. and not at 37°C. are nonpathogenic to human beings and it might be considered that their number is immaterial. On the other hand, their number does give some indication of the amount of organic matter available for bacterial nutrition and of the amount of dust and other extraneous matter that has gained access to the water. For example, after a heavy rain the 20°C. count will frequently show a much higher increase than the 37°C. count. A good water will have a relatively low 20°C. count, while a high count is an indication of some undesirable although not necessarily dangerous condition.

At the Laboratory of the Lawrence Experiment Station a modification is made in the standard procedure of obtaining the 37°C. count. Instead of regular agar, an agar containing lactose is used, and a small amount of litmus is added to the plate with the sample. It is hardly necessary to state that all apparatus and media must be carefully sterilized before use. When the count is made on such a plate it will be found that any organisms which have the ability to ferment lactose, and these include the coli-aerogenes group, will have formed some acid which will turn the blue litmus to red in the immediate vicinity of the colonies. The count is made of the total number of colonies and of the number of red colonies. Not all the red colonies are coli-aerogenes, but the presence of acid formers is an indication of undesirable conditions.

The number of coli-aerogenes present in a water is the real test of its sanitary quality; the preceding tests are supplementary.

Nearly all, if not all, water-borne pathogenic bacteria originate in human excreta. It is not practicable to isolate pathogenic organisms from water, partly because of the infrequency of their occurrence and partly because no reliable methods of procedure have been developed. The members of the B. coli group are specific organisms of the human intestine and whenever found in water give fairly certain indications of fresh pollution. Unfortunately, there are numerous types of B. coli which are not definitely of human origin. B. aerogenes occur in the human intestine but also in cultivated soil and on grains. There has been little evidence of B. aerogenes from the last two sources in unpolluted waters in Massachusetts, although this condition does not follow in other parts of the country. B. coli and B. aerogenes are also present in excreta of birds and animals. It has not been found practical to try to separate fecal from nonfecal coli-aerogenes.

All nonspore-forming, Gram-negative organisms which ferment lactose with gas formation and grow aerobically on standard solid media are considered as belonging to the coli-aerogenes group. The procedure for determining the number of coli-aerogenes consists in inoculating lactose broth with measured portions of the sample and incubating at 37°C.

In the case of a supply for domestic use, five 10 cc. portions are taken; for polluted waters, 1 cc., .1 cc., .01 cc. or even less are taken, the aim being to take enough dilutions so that the final one shall show no coli-aerogenes. The dilutions are made by adding 1 cc. of the sample to 9 cc. of sterile water. One cc. of this is equal to .1 cc. of the original. By repeating this dilution any desired decimal fraction of 1 cc. can be obtained.

If members of the coli-aerogenes group are present, gas will be formed in the tubes of broth at the end of twenty-four or, at the most, forty-eight hours' incubation. For routine work, positive fermentations are confirmed by making streaks on eosin, methylene blue, agar plates with a needle dipped into the tube. The presence of coli-aerogenes is shown by the appearance of characteristic colonies after incubating eighteen hours at 37°C.

If all five of the 10 cc. portions of water tested show presence of coli-aerogenes, the water must be considered unfit for domestic use. If all five are negative for coli-aerogenes, the water may be considered good. If only one portion is positive, the water may be considered reasonably satisfactory, although not within the limits of the United States

Treasury Drinking Water Standard which allows not more than 10 per cent of the portions examined to show the presence of organisms of the B. coli group. In such a case further samples should be taken to determine whether the water comes within this limit. If more than one and less than five are positive, the quality of the water is doubtful and should not be used until further tests and an inspection of the source and surroundings have been made. If there is then no improvement, the water cannot be considered fit for domestic use.

CHLORINATION OF WATER SUPPLIES

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The first use of chlorine gas for disinfecting a public water supply was in 1913. Its use since then has been one of the greatest factors in reducing the number of water-borne epidemics. At the present time such epidemics are rare. It has been the policy in Massachusetts to reduce the possible sources of pollution on water supply drainage areas and to discourage the use of these areas for picnicking, hunting, fishing or other recreational purposes which would result in an increased number of persons visiting the watershed areas. In addition to these precautions, it has been necessary to install chlorinating apparatus in connection with most of the surface water supplies in the State in order to destroy the occasional pollutional bacteria found in the water and as an insurance against accidental contamination of water beyond the control of the water works authorities.

At the present time approximately 80,000,000 people in the United States are supplied with water from public water supply systems, of which over 85% drink chlorinated water. Chlorine has become the principal disinfecting agent used in water because of its effectiveness when used in small quantities, its low price and the ease with which it can be applied to the water. Chlorine is supplied commercially in three forms: as a gas, as a powder such as calcium and sodium hypochlorite, or as a liquid such as bleach solution. Chlorine gas is the most commonly used method of disinfection due to the fact that the gas is inexpensive and easy to apply. Chlorine gas is usually made by the electrolysis of a salt solution, often sodium chloride. In its manufacture moist gas is given off from the electrolytic cells and is purified and compressed into a liquid and shipped in steel cylinders or in railway tank cars. Releasing the pressure upon the cylinder causes the liquid to vaporize and the chlorine is introduced into the water as a gas.

As the amount of chlorine used in the disinfection of water customarily varies from 3 to 8 pounds per million gallons of water, it is necessary to apply the gas through exceedingly sensitive and rather expensive machines. The disinfection of water by chlorine is harmless to the water consumers. The average amount of chlorine consumed by each consumer per year is hardly measureable.

The effectiveness of the application of chlorine upon the bacteria is determined by the bacterial examination of the chlorinated water. The dosage of chlorine necessary for the proper disinfection of the water is related directly to the amount of organic matter in the water. Ground water from wells, which is usually clear, colorless and low in organic matter, requires a very small amount of chlorine for proper disinfection. Surface water supplies generally require larger amounts, especially those supplies that are colored and turbid. Color and turbidity in water indicates a higher organic content which interferes with the action of the chlorine, thus causing a larger dosage to be required. While chlorine is a bleaching agent the amount added to water supplies is so small that it has practically no effect upon the color of the water and will not materially affect the chemical quality or appearance of the water.

Another advantage in the use of chlorine is that after it has had a few minutes contact with the water, a simple test can be made below the point of chlorination for the presence of residual chlorine in the water. Thus the water works' operator knows whether the chlorine dosage applied is effective. The amount of excess chlorine carried in the water is very small, varying from 1 part in 5,000,000 parts to 1 part in 10,000,000 parts. This excess chlorine is usually dissipated before reaching the taps of any of the consumers.

With the proper dosage of chlorine being applied to the water and the use of suitable apparatus for applying the chlorine, it is virtually impossible for a consumer to taste chlorine alone in the water, especially in this section of the country where the sources of water supply are relatively unpolluted. Chlorine in water containing microscopical organisms very often results in the imparting of a disagreeable taste and odor to the water. The kind of taste and odor from microscopical organisms depends upon the particular organism found in the reservoir. This can be reduced by proper control of the microscopical organisms in the reservoirs or at filtration plants prior to the chlorination of the water. In order to permit better operation, at some filtration plants chlorine is used prior to filtration for the destruction of microscopical organisms.

The cost of disinfecting the average water supply with chlorine varies from 30 to 60 cents per million gallons of water treated. It is, therefore, a very inexpensive means whereby the consumer will be assured of a water free from pollutional and pathogenic bacteria, with a resultant feeling of security for him as well as for the water works officials However, if the water is polluted filtration or other more adequate means of protection to the public health may have to be provided.

CORROSION OF HOUSE PLUMBING—ITS CAUSES AND RESULTS*

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One of the many functions of the State Department of Public Health is the examination of public water supplies including routine analysis of water samples. The data thus obtained supply the necessary information from which the Department may make recommendations with regard to maintaining high standards of purity of our Massachusetts water supplies. In addition, the chemical analysis reports the determination of those properties of the water which are known to cause corrosion of metals. This is essential as some raw and treated waters act rapidly on certain metals, mainly lead, with the result that the products of corrosion which are carried into solution may be toxic to some individuals if habitually used.

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* Health Forum Release No. 318.

All water is corrosive to metals, but the extent of corrosion varies with the material used and the corrosive properties of the water in contact with it. The unprotected ferrous metals are subject to more rapid corrosion than those having coatings of zinc or Portland cement, and in general the nonferrous metals such as brass and copper are least affected. The science of metallurgy has given us in recent years many improvements in the materials commonly used for water pipes, and before many years have passed we may expect to have other materials at a price within ordinary means which will give longer service than those which are now available.

The properties of water which are known to cause corrosion are mainly dissolved oxygen and carbonic acid gas or other organic acids; and the degree of hardness, or rather the lack of hardness in some waters, causes an increase of deposits on the interior walls of pipes. The three main types of corrosion are known as self-corrosion, galvanic corrosion and electrolytic corrosion. Self-corrosion is caused by passing through the pipes water which has excessive amounts of dissolved oxygen and carbon dioxide, and in addition corrosive action is accelerated by increases of temperature; thus hot water boilers and hot water piping systems may fail before the cold water pipes cause trouble even when the same pipe materials are used. This is explained by the fact that chemical reactions take place more readily as the temperature is increased. Galvanic corrosion occurs when dissimilar pipe materials or fittings are brought into contact in the presence of water. This action may be compared with the wet cell type of battery sometimes used as a source of electrical energy where two dissimilar metals are placed in an acid solution; the chemical action causes the metal having the lower value of potential to go into solution, causing hydrogen to form around the other material. The metal lost in solution cannot be replaced and, in the case of the pipes, causes loss of strength. This same action can be found in composition pipe materials or in iron pipes with impurities and is the direct cause of pin hole leaks. Electrolytic corrosion is the result of stray or grounded electric currents passing from the pipe material to ground or other objects of different electric potential; this results in leaks at those points where the current leaves the pipe. Studies have recently been made to determine the effect on water carried in pipes where electric currents of varying intensities are known to exist, and it has been shown that certain deterioration takes place.

The results of corrosion in house plumbing are manifest in general first by discoloration of the water, then by a slowing in the rate of water drawn from taps, and from leaks which may be caused by self-corrosion or galvanic corrosion at fitting joints, as well as "red water" troubles when iron pipe is used and staining of plumbing fixtures by blue or green deposits commonly found when brass and copper pipe is used. Where new plumbing is contemplated or replacements are made necessary it is worth while to investigate and determine the best materials to be used for the existing water supply conditions.

LEAD IN DRINKING WATER SUPPLIES*

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Water as it falls in the form of rain tends to dissolve small amounts of gases from the atmosphere. Water as it flows in rivers or through the ground dissolves minute amounts of various salts from the rocks and minerals with which it comes in contact. It also tends to dissolve some vegetable and peaty matter from the plants with which it comes in contact. So that water as it is present in reservoirs, or as it comes from wells, or flows in rivers, carries dissolved in it minute amounts of mineral and vegetable matter. In addition, it has in solution varying quantities of gases such as carbon dioxide and oxygen.

When water is conveyed from the reservoir or the wells to our homes through various kinds of piping it has a slight solvent action on the metal of which the pipe is composed. Waters vary in their solvent action, some being more active than others. Usually the more acid a water is the more corrosive it is. With some of the metals the material which is dissolved from the pipe redeposits on the inside of the pipe, for instance, when iron is dissolved from the inside of pipes it redeposits in the form of iron oxide or iron rust. This is called a protective coating and protects the pipe from any further corrosive action of the water. Also, if the water has considerable amounts of mineral or vegetable matter in solution it deposits this on the inside of the pipe and so helps to protect the pipe from further corrosive action. Another way in which service pipes corrode is through galvanic action when pipes of dissimilar metals are joined together, as for instance, when service pipes of lead are connected with other pipes such as copper, brass and galvanized iron there is a minute electric current set up between the dissimilar metals. This causes some of the metals to go into solution in the water. Still another cause of corrosion is that of stray currents of electricity due to the grounding of electrical connections on the water pipes. This causes an eating away of the pipe and the metal goes into solution in the water.

Of the metals in common use today for service pipes, the most significant from the health standpoint is lead. The reason for this is, that it has been found that small amounts of lead have a toxic action on the human system. Also, lead is an accumulative poison, that is, lead salts when taken into the system are not readily eliminated but tend to remain and when the concentration reaches a certain point symptoms of lead poisoning appear. In fact, the question of lead in drinking water supplies has become so important in recent years that the United States Treasury Department has fixed the maximum amount of lead allowable in drinking water at .10 parts per million.

One method of eliminating the lead content of drinking water supplies is by decreasing the solvent action of the water. This may be done by removing the acid-forming gas, carbon dioxide, by aerating the water in which case this gas escapes from solution or the acidity of the water may be decreased by adding lime or soda ash.

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* Health Forum Release No. 378.

A very practical way to avoid the possible presence of lead in the drinking water when lead pipe is used is to allow the water to run to waste a few minutes the first thing in the morning to allow the pipes to empty themselves of any possible amount of lead which may have been dissolved from the house plumbing on standing overnight. These precautions are advised by the Department in cases where harmful quantities of lead have been found.

Lead poisoning in Massachusetts has been decreased considerably in the last few years. This has been due to our study of the nature of the corrosive action and to our methods of either removing lead pipe where the water is corrosive or treating the water to decrease its corrosive action so that lead poisoning has been materially eliminated as a health hazard.

It is therefore advisable to avoid as much as possible the use of lead pipe for drinking water systems especially where the corrosive properties of the water are not known.

THE TREATMENT OF SEWAGE*

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Sewage has been defined as the water supply of a community after it has been fouled by a variety of uses. From a consideration of its sources, we may define sewage as a combination of the liquid or water carried wastes from residences, business buildings, institutions and industrial establishments together with such ground surface or storm water as may be present. Sewage when fresh is a gray liquid, looking like dirty dishwater and generally has little odor. When stale, it becomes black in color and foul in odor.

Sewage is made up mostly of water containing various solids in solution and suspension. The first step in the treatment of sewage is the separation of the suspended solid matter from the liquid. This may be done in a number of ways, depending upon the degree of separation required. For example, we may remove large objects by bar screens—that is metal bars with openings of ½ to 4 inches. Smaller particles may be removed by fine screens, usually metal plates with slots—1/32 to ¼ inch in width, and usually about two inches long. Then we can remove sand in channels by reducing the flow to about one foot per second.

Grease, fats and other floating solids can be removed in skimming tanks. The sewage is allowed to stand in tanks or to flow slowly through the tank and the grease, fats and other substances which rise to the surface are skimmed off. Sometimes air is bubbled up through the sewage to aid in separating the grease from the sewage and the settling solids.

Best separation of solids from liquid, however, can be obtained in settling tanks. The heavier solids settle to the bottom and are usually removed mechanically by scrapers and then pumped to other tanks for treatment and disposal. The floating solids may be removed by skimming devices in the settling tank. With a two-hour settling period, about fifty per cent of the suspended solids are usually removed. With the use of chemicals, such as alum, or iron salts, the removal of suspended solids may be increased to 80-85%.

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* Health Forum Release No. 247.

After the solids have been removed, they may be disposed of either with or without preliminary treatment by discharge at sea, by incineration or on land. The liquid may be further purified and the organic substances in solution may be destroyed with the aid of bacteria and small organisms. One common process called intermittent sand filtration, is the discharge of settled sewage over properly prepared beds of sand. The degree of purification is very high but the large areas required make the method suitable only for smaller cities. About 10-20 acres are required per million gallons of sewage or for a population of 10,000.

Trickling filters in which the sewage is sprinkled over beds of stone 6-10 feet in depth are also very efficient in purifying sewage. The stone, which is commonly 1½ to 3 inches in diameter, becomes covered with a gelatinous film containing large numbers of bacteria and larger organisms.

This film absorbs the organic substances and these are worked over by the organisms in the film. The area required by this process is still large, but only about 0.1 of that required by sand filters.

A system often used by large cities for nearly complete purification of the sewage is the activated sludge process. By this method, the settled sewage is aerated for a period of six to eight hours and then discharged to a settling tank. The solids which settle are returned to the aeration tank and in ten days or two weeks a biological growth forms in these solids, or sludge, which purifies the sewage. Purification then depends upon the aeration of the sewage in the presence of this "activated" sludge. By the activated sludge process we may obtain 85—90% purification of sewage in a relatively small area—about 1/5 that required by trickling filters.

We may then purify sewage to nearly any degree by use of these methods, or by combination of them. It is only necessary to decide upon the degree required by the case in question.

WHAT CONSTITUTES A SAFE BATHING PLACE*

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The subject of this paper is applicable both to outdoor and indoor bathing places although during the summer months the general public is more particularly interested in the former. The Massachusetts Department of Public Health has not adopted any set standards of purity of bathing waters but in advising relative to such matters the Department is guided by the standards recommended by the Joint Committee on Bathing Places of the Conference of State Sanitary Engineers and the American Public Health Association. Reprints of the report of this committee are obtainable upon application to the Department of Public Health.

Although the quality of water of an indoor pool is more easily regulated than that of an outdoor bathing pool, the same standards of cleanliness and bacterial quality should apply to both. We do not wish at home to bathe in the same water in our bathtubs that other members of our family have used previously and yet unsuspectingly we may plunge into the water of an indoor pool or at some popular outdoor bathing beach which has already been used by large numbers of people and where the water is much inferior in quality to that in the bathtub.

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* Health Forum Release No. 499.

A most important factor in the operation of an indoor pool is the recirculation of the water of the pool or the addition of fresh water. The standards of the Joint Committee recommend at least two complete changes of water, or turnovers, per 24 hours, and preferably three or more.

For a safe outdoor bathing place it is necessary that there be sufficient flow of water so that even in the driest periods there will be an adequate change of water.

This Department has found that communities or organizations frequently establish, or consider the establishment of, bathing places along small streams, the flow of which in the dry season is inadequate to provide a satisfactory change of water. In cases such as this the natural flow of the stream should be augmented either from the public water supply or by providing an auxiliary water supply. The Joint Committee, while not recommending any specific amount of diluting water for pools along small streams, states that it is probably fair to say that less than 500 gallons per bather per day is too small a diluting volume without disinfection.

Local authorities should take steps to prevent promiscuous bathing at unauthorized bathing places in their communities. Without disinfection, the use of small ponds by large numbers of bathers also may be a dangerous practice as such ponds may not have the same diluting effect that is to be had in larger bodies of water. To maintain the water of a bathing pool in satisfactory condition disinfection is desirable. This disinfection may be accomplished by the use of hypochlorite of lime, by the introduction of chlorine using one of the various types of commercial chlorinators that are available, or by the use of chlorine and ammonia. Even more important than the disinfection of the water at the bathing point is the necessary activity by the proper authorities to protect the stream from sewage pollution at points above the bathing places.

The Department of Public Health has found that it is very difficult to prove any increase in the prevalence of communicable disease by the use of polluted water for bathing, but regardless of the absence of facts it is obviously wrong to encourage bathing in waters containing sewage. In this connection it should be stated that some authorities claim that sewage provides one of the most likely places where the virus of Infantile Paralysis can lurk.

It should be stated that the Department annually makes numerous analyses of the waters of bathing places at the request of municipal or camp officials and that in most instances the water is found to be of suitable quality for public bathing. It is well that in recent years the general public has become bathing-minded and in conclusion it might be said that, if we apply common sense in the protection of our bathing waters, we shall have little about which to worry. It is only when we permit the use of grossly polluted waters for bathing that we invite sickness from this source.

OVERNIGHT CAMP SANITATION*

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The overnight camp is a development of present-day life which is associated with the increasing number of automobiles. Overnight camps are located principally along the main travelled routes and are generally found outside of cities and towns, most often at some vantage point, such as a hill commanding a view or near a pond or grove, field or other open space. The average automobile traveler probably stops at an overnight camp because it is cheaper than going to a hotel with the necessary garaging of the automobile. Again the spirit of camping out while on vacation is a factor. Most overnight camps are unheated and in this state are not operated during the cold weather.

Anyone who has done much travelling over the highways realizes the great difference in the caliber of the overnight camps. At some of them the sanitary conditions are excellent, but in many cases sanitation in some phase or other is badly neglected. Everyone is or should be interested in obtaining drinking water of good quality. At any overnight camp where the water comes from a municipal supply there is nothing to worry about. Any other source, such as a well or spring should greatly concern the user if there is any danger or threat of pollution by reason of location near a privy, cesspool, or septic tank or if it is not protected against the entrance of surface water or foreign matter. The drinking water supply should be of good sanitary quality and of sufficient quantity and should be approved by the State Department of Public Health. Any well or spring of poor or questionable quality should be closed to use or posted as unsafe. It has been stated that "Water is the most essential commodity, other than air, to the continuation of life."

The next important aspect of overnight camp sanitation is that of proper sewage disposal. The rest room, comfort station or, as it is generally called, the toilet should be of a standard of cleanliness that no one need hesitate to use it. In many cases the toilet or old-fashioned privy is very offensive and is enough to discourage patronage at some camps. All sewage from the camp should be disposed of in ground that is lower in elevation than that where the water supply is obtained, and also at a considerable distance from it. Pit privies may provide a satisfactory method of disposal, but they should be so constructed that flies and other insects cannot have access.

The privies should be so maintained that they will not cause odors. For small camps it is common practice to have an earth vault 4 to 6 feet in depth, disinfecting the contents effectively with chloride of lime daily and covering them also with fresh soil. Some overnight camps are provided with chemical toilets while some have modern flush toilets connected with cesspools or septic tank and subsurface disposal drain. Another phase of overnight camp sanitation is the proper disposal of garbage and waste. It is essential that garbage and waste be kept in tightly-covered receptacles and emptied at frequent intervals. Overnight camps should be provided with proper screens to keep out flies and mosquitoes. Overnight camps should have signs posted indicating the location of water supplies, toilets and receptacles for garbage and refuse.

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* Health Forum Release No. 391.

The State Department of Public Health is glad to furnish overnight camp owners advice in regard to water supply and sewage disposal or other correlated problems which they encounter. By a more complete cooperation between the camp owner and the Department it will be possible to improve sanitation to the mutual benefit of the user of the camp and the owner.

MAKING MASSACHUSETTS SHELLFISH SAFE AND WHOLESOME

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Not only oysters but other shellfish are relished by many of our citizens and also by the numerous visitors to our Commonwealth. Our State has always been famous for the quality and wholesomeness of its shellfish.

Under the name "shellfish" are usually included all mollusks, such as oysters, mussels and all varieties of clams. It is the mollusks with which we shall occupy ourselves during this talk.

On account of their peculiar anatomy these mollusks or as they are also known "bivalves" deserve our special attention, due to the fact that when eating oysters, clams or mussels, we consume the entire body except the shell, thereby transferring into our own digesting system the entire digestive tract of the mollusk.

Shellfish generally feed on microscopic plants known as "diatoms" found in tidal waters and also certain soluble lime salts. Relatively large quantities of water are passed through the body of the mollusk which filters out and retains the microscopic food and also bacteria which are found in the water. It is estimated that the ordinary soft-shell clam filters through its system about 10 gallons of water per day. It is obvious that any bacterial contamination of the overlying water, therefore, will result in the contamination of the shellfish living therein and shellfish taken from waters polluted by sewage or wastes, are consequently dangerous to the public health.

It is one of the functions of the Massachusetts Department of Public Health to see that shellfish offered to the consuming public is safe and wholesome. In order to accomplish this purpose, the following measures are taken:

The Department prohibits the taking of shellfish from areas which are subject to contamination and in accordance with the provisions of Chapter 130 of the General Laws, as amended, it examines from time to time the tidal waters and flats in the Commonwealth in order to determine what areas "are so contaminated that shellfish obtained therefrom are unfit for food and dangerous to the public health."

When an area is found to be so contaminated a notice to that effect is published in a local newspaper and printed notices are posted at points near or on any such area. The findings are enforced by the coastal wardens of the Division of Marine Fisheries of the Massachusetts Department of Conservation. As many of the readers or their children are probably fond of digging clams or taking other shellfish while at the beach, it is recommended that they first ascertain whether the area where they intend to dig is uncontaminated.

Some of the areas upon which restrictions were placed by this Department were found to be only moderately polluted and experiments have shown that shellfish taken from such areas and placed in clean waters eventually cleanse themselves and become free of harmful bacteria. Accordingly, such shellfish are frequently transplanted under the supervision of the town shellfish authorities or the State Department of Conservation to clean areas where they are allowed to remain until the Department of Public Health upon examination finds that the shellfish have sufficiently cleansed themselves and can be safely released for food purposes.

In addition to this transplanting, a process providing for the purification of shellfish has been developed consisting briefly as follows:

Clams or quahaugs are taken from moderately contaminated areas which were approved by the Department of Public Health by authorized persons holding special permits from the Conservation Department and are transported to an approved purification plant where they are thoroughly hosed with clean water and then placed in tanks containing sea water. Small quantities of chlorine are added from time to time sufficient to sterilize the water, and air is blown through the water in order to supply the necessary oxygen. All shellfish must remain in the tanks for at least 24 hours and samples of the raw and treated product are examined by a trained bacteriologist who is in charge of the plant. Check samples are also examined regularly at the State laboratory.

Two such shellfish treatment plants are now in operation, one in Newburyport and one in Scituate. The plants are under the general supervision of the Department of Public Health and their operation is checked regularly by representatives of this Department. During 1938 a total of 12,258 barrels of soft-shell clams and quahaugs were treated at the above plants. Thus, in addition to reclaiming large quantities of shellfish, an opportunity is provided for many of our citizens to make a living in the shellfish industry.

After the shellfish are taken from their "beds" or upon their leaving the purification plant, they require still further attention as they must be safeguarded from contamination by improper handling. For this purpose, all establishments dealing either in shell or shucked stock are periodically examined by our inspectors, and dealers' permits or certificates are issued by the Department of Conservation only to those dealers whose plants are found properly equipped, and in a clean and sanitary condition in conformance with the rules and regulations of the U. S. Public Health Service. In 1939 a total of 2,115 examinations of shellfish handling establishments have been made and the great majority of these were found to be in good sanitary condition.

The examination of shellfish producing areas, the supervision of purification plants, and the inspection of shellfish handling establishments require constant care on the part of certain of our engineers, bacteriologists and inspectors who, in cooperation with our shellfishermen and the Department of Conservation, strive to maintain the good reputation of shellfish products of our Commonwealth.

CONTROL OF NUISANCES[*]

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The control of nuisances in the up-to-date public health department is in a sense a less important subject than many of the public health problems relating to the control of disease transmitted from man to man. The difference in opinion between the medical man and the nonmedical health agent in the fight against disease and in the improvement of the public health was over years ago, perhaps when Chapin pointed out so forcibly that a cesspool is dangerous to health principally when some one falls into it. In the 90's, much of the work of the Massachusetts Department of Public Health was of a sanitary engineering character. While that work has grown very considerably since 1900, the other divisions of state health work of a medical character have grown by leaps and bounds with the vast increase in medical efficiency. This does not mean there is nothing left to be done by the nonmedical man in public health, for nuisances and environmental upsets will continue just as surely and regularly as taxes. This was so with our grandfathers and great-grandfathers, and the work of the health department is still assumed by many to be largely in nuisance control.

The sense of smell is one that cannot be ignored. Organized cleanliness is essential for a happy environment and, while the purpose of up-to-date public health work is to prolong life, it is not necessarily advancing it to a high plane unless the sanitarian has an important part in the picture. The American people will doubtless continue to insist that health and comfort be kept together and not be separated by law. The control of a nuisance and the object of sanitary work is not necessarily to prevent injury to health but more largely to promote health in much the same way that a safe water supply may be filtered or otherwise treated to reduce color rather than to remove germs of disease.

Rosenau[1] defines a nuisance as "the use of one's property in such a way as to injure the rights of others, and inflict damages." A nuisance is an annoyance or discomfort. Blackstone has said that a nuisance "is anything that worketh hurt, discomfort or damage." Another noted lawyer has said "a nuisance is whatever the courts find is a nuisance."

Section 152 of the Massachusetts General Laws, Chapter 111, relating to offensive trades, and which in part dates back to 1710, links public health, comfort, and convenience, while Section 143 on the same subject, dating back to 1692, authorizing local departments of health to assign places for carrying on offensive trades, links nuisances with matters "hurtful to the inhabitants, injurious to their estates, dangerous to the public health," and those "attended by noisome and injurious odors." The sanitary inspector must consider the magnitude of the offensive condition, the distance to habitations, its frequency and duration, and the unreasonableness of the use of the property, before the condition is determined a nuisance. The results of the control of a nuisance, while beneficial to the complainants, are not spectacular like the correction of a sudden infection of a water supply or the prevention of other forms of infection resulting in an epidemic.

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[*] Read before the Public Health Engineering Section of the American Public Health Association at the Sixty-sixth Annual Meeting in New York, N. Y., October 7, 1937. Reprinted from the *American Journal of Public Health*, 28:579-586, May, 1938, by permission of the American Public Health Association.

The late George C. Whipple gave much thought to sanitation and its relation to health and life. He felt that sanitation would always be the foundation of sound public health. Many of Professor Whipple's ideas were presented in a paper before the Sanitary Engineering Division of the American Society of Civil Engineers on January 15, 1924.[2] Another paper of interest on the subject is that of L. L. Tribus on "Odors and Their Travel Habits."[3] Still another is that of C.-E.A. Winslow on "The Atmosphere and Its Relations to Human Health and Comfort."[4] In fact, the American Society of Civil Engineers in January, 1925, held a symposium on the detection and elimination of odors.[5] In this symposium the law on nuisances is expounded by Irving I. Goldsmith, then Deputy Attorney General of New York. He refers to a decision of the United States Supreme Court[6] which contains the following statement:

" . . . it has been the settled law, both of this country and of England, that a man has no right to maintain a structure upon his own land, which, by reason of disgusting smells, loud or unusual noises, thick smoke, noxious vapors, the jarring of machinery or the unwarrantable collection of flies, renders the occupancy of adjoining property dangerous, intolerable or even uncomfortable to its tenants. No person maintaining such a nuisance can shelter himself behind the sanctity of private property."

In summing up Mr. Goldsmith states that,

" . . . The law seems to be adequate to protect the public welfare and enjoyment of property, but resort to the Courts for relief appears to be on the wane for the reason that the skill and ingenuity of the Engineering Profession are eliminating the causes which contributed so largely to the undesirable and unhealthy odors and vapors permeating the air in and about cities and villages . . . "

The control of a nuisance may often be a matter of common sense, but of course the remedy in many instances requires the attention of a sanitary engineer. The health departments in most of the larger cities now have a sanitary engineer on the staff, but the health departments of towns rarely can finance a man as a sanitary inspector of more than high school training, and this service of the local department of health has not been kept so much on the up-grade as the other branches. Practically all of the state departments of health, however, now have sanitary engineering divisions and these engineers are equipped to assist the local boards of health in the control of the more complicated nuisances.

As the matter is handled in Massachusetts, a nuisance problem comes before the local board of health first probably by verbal complaint which may rightfully be ignored, and later by signed written complaint which results in an examination by the sanitary inspector. In the large majority of cases, where spite is not involved, the sanitary inspector can readily control the situation either by having the nuisance abated or by making recommendations as to its control. The state department does not go into the matter except to advise the local department upon request or until the local remedies are exhausted, or where two municipalities are involved.

One of the most notable examples involves the intensive industrial district in Everett, Mass., about which complaints have been made by citizens of Everett, Chelsea, Revere, Malden, Medford, Somerville, Cambridge, Arlington, Watertown, and parts of Boston. The causes of these complaints were the odors produced by the very active industries engaged in the refining of oil, the manufacture of various chemicals, particularly sulphuric acid, the manufacture of illuminating gas, and the manufacture of varnish. The first complaint was made in regard to the gas works over 30 years ago. In 1913, in 1922-1923 and again in 1926, numerous complaints were registered with the local departments of health and with the state department. Various improvements were made in the manufacturing processes from year to year, and when the odor elimination devices were given suitable attention, the complaints died out, but as carelessness crept in, objectionable conditions again appeared. In 1932, the Legislature passed a resolve directing the Massachusetts Department of Public Health to investigate the causes of the offensive odors in this district; to determine the effect, if any, upon the public health; and to report the matter to the next session of the Legislature. During the long period of intermittent investigation before the passage of this resolution the matter was taken to the Supreme Court of Massachusetts and the following is quoted from the decision:[7]

" . . . The defendant (Beacon Oil Co., Everett, Mass.) is engaged in a lawful business in the conduct of which it is found that odors necessarily will escape into the air; but it also appears that the defendant has adopted the most approved methods and devices to control and confine such odors at an expense of many thousands of dollars; it also is further found that such odors would not be unbearable or injurious to the health of normal persons. . . Whether there is a nuisance in a certain locality depends upon the attendant circumstances, including the character of the neighborhood, the acts complained of and their effect upon the comfort or health of people in general. The district where the defendant's plant is situated has for many years been increasingly devoted to manufacturing purposes; some of the plants were there located many years ago, and from some of them odors are thrown off at times which are offensive and disagreeable, but as those discharged by the defendant are not injurious to the lives or health of normal persons, it cannot be held that a nuisance exists in view of the findings of the master to the contrary.

"It is a matter of common knowledge that in thickly settled manufacturing communities the atmosphere is inevitably impregnated with disagreeable odors and impurities. This is one of the annoyances and inconveniences which every one in such a neighborhood must endure. Mere discomfort caused by such conditions without injury to life or health cannot be ruled as matter of law to constitute a nuisance. Each case must depend upon its own facts and no rule can be formulated which will be applicable to all cases. Rogers v. Elliott, 146 Mass. 349. Downing v. Elliott, 182 Mass. 28. Stevens v. Rockport Granite Co., *supra* . . . "

In the course of the department's investigation[8] the amount of sulphur dioxide in the air was determined by means of an adaptation of the Palmer dust apparatus operated from a special storage battery with a rotary converter, all carried in an automobile. Of 103 determinations, 31 per cent contained 0.001 mg. or more of sulphur dioxide per liter of air, the highest determination being 0.00897 mg. at a point 0.6 mile from the oil refinery. Careful observations for odors were made in the surrounding territory on the leeward side of the various industrial plants throughout much of the time covered by the investigation—June 27 to November 21, 1932. The time when an odor was noticed was recorded together with the distance from the probable source where it was offensive and where it was noticeable. The reports also contained information as to the character of the odor, the probable source, the mean temperature, the relative humidity at 12 M., and the average wind velocity.

The department was required to determine the effect of the odors upon the public health and comfort and it attempted to detect any possible menace to the public health in Chelsea, Everett, and adjacent areas by studying the data on general death rates, infant death rates, respiratory disease death rates, as well as chronic disease death rates in these and in control areas. This study showed no evidence of any menace to the public health in Everett and Chelsea and the adjacent areas due to the industrial odors, fumes, and gases. Certain of the data in fact were more favorable for these areas than in other industrial areas in the state used as controls. The department obtained information, however, showing that the public comfort in parts of the municipalities was affected by the odors.

During the investigation covering 5 months, only 3 complaints were made to the department of industrial odors, fumes, and gases, and it thus appeared that due to increased vigilance on the part of the plant operators, probably effected by the presence of the department's agents, the odors were kept under reasonable control. Each of the large industrial concerns involved was equipped with a research department engaged from time to time in the development of odor control improvements, and through the efforts of the department various additional improvements were suggested which appeared to effect an improvement. The final result of the investigation was the suggestion that the scientific personnel of the various large concerns in this district continue to devote such time as is necessary to the investigation of odor control devices and to their operation. Most of the industrial concerns in this region are still in operation but the department has received no complaints for some years.

It is impracticable in this paper to list all of the matters pertaining to nuisance control which require the attention of sanitary inspectors. Rosenau gives the following[1]:

filth
garbage
ashes
slops
cesspools
faulty cellars
overcrowding of tenements
weeds
railroad toilets
salt used on streets in snowy weather

privy vaults
sink drains
dumps
wet and soggy lands
defective plumbing
spitting in public places
keeping of horses, cattle and swine
dead animals
stagnant water

To this list should be added smoke, dust, flies, and mosquitoes.

Of the above list, the matters other than those having to do with sewage disposal, flies, mosquitoes, defective plumbing and overcrowding of tenements probably have comparatively little to do with communicable diseases, but where cesspools overflow onto the surface of the ground, where privies are open to flies and where malaria is present, conditions dangerous to the public health may easily result.

There are many publications on methods of rural sewage disposal. Probably one of the best is *Farmers' Bulletin* 1227 of the U. S. Department of Agriculture. On March 26, 1937, the U. S. Department of Agriculture, Resettlement Administration, issued a paper on "Standard Methods and Designs for Sewage and Waste Disposal Installations on Land Development Projects," which is excellent. It goes into the design and construction of privies, cesspools or leaching pits, septic tanks, Imhoff tanks, sand filters and other methods of sewage disposal. Years of experience have shown that many individuals believe septic tanks to be a cure-all for sewage disposal problems. In fact, certain sanitary engineers feel that when a properly designed septic tank has been constructed the local sewage disposal problem is solved. Septic tanks unquestionably are of value as a preliminary form of fresh sewage treatment but as average domestic sewage is generally over 95 per cent water some means of disposal of the effluent is much more important than the design of the septic tank, and they accordingly should be considered only as a preliminary means of treatment before discharging the effluent into cesspools or subsurface distribution pipes properly laid in and surrounded by crushed stone or coarse gravel. These distribution pipes should be of adequate length, 20 to 100 ft. per person, depending upon the character of the soil. In designing or constructing a cesspool, information must be obtained first as to the character of the soil and depth to ground water. The location in relation to sources of water supply is of importance, and if 2 or more cesspools are required the effluent from the first should be piped through an elbow or tee taking off from below the flow line. Grease traps are important where kitchen wastes are to be treated.

In the rules and regulations adopted by the Massachusetts Department of Public Health for the sanitary protection of water supplies, no cesspools or other means of sewage disposal are permitted within 50 ft. of the high water mark of any source of water supply or tributary thereof, nor within 250 ft. unless such receptacle is so constructed that no portion of its contents can escape or be washed into such waters. Other rules and regulations provide that means of sewage disposal should be at least 100 ft. from any pond where bathing is permitted, and at least 200 ft. from any well or spring.

In the construction of a privy, consideration should be given to having the vault water-tight and easy of access so that it can be cleaned when required. The privy should be rain-proof, rat-proof, and fly-proof, located inconspicuously and remote from any water supply. If at no great distance from a well, it should be located at an elevation below the bottom of the well. The contents should be disposed of at places selected by the local health department.

In certain Massachusetts municipalities where difficulty has been experienced in the disposal of night soil, arrangements have been made to convey this material to the nearest municipality having a sewerage system whence it is discharged through manholes or suitable hoppers, generally with screening devices, into the system. In the construction of the sewerage system of the city of Lynn, Mass., a hopper was provided near the sewage pumping station whereby any night soil or similar sewage material could be discharged through a screen into the sewerage system. This arrangement of conveying the night soil to an adjacent sewered municipality has been consummated in one of the municipalities not having a sewerage system which is located on the watershed of one of the larger water supplies.

Public dumps probably cause as many complaints to the local board of health as any other one subject, due particularly to dust, rats, flies, cockroaches, smoke, and foul odors. The owner, agent, or lessee of any land or enclosure used as a dump, should cause all offensive matter dumped thereon to be immediately covered to the satisfaction of the sanitary inspector, and all other refuse matter should be kept leveled. Regulations should be adopted whereby no person may dump any offensive material upon any dump unless permitted to do so by the board of health, and all possible care should be used in preventing the escape of dust and papers from the dump or the vehicles used in conveying waste materials to the dump.

Of course, it is impracticable wholly to prevent dumping of foul materials. Individuals sometimes convey waste materials from one municipality into another and in several cases detective work has disclosed tags or other information indicating the source from which the material came.

Dump fires are the cause of considerable offense. The writer has seen smoldering dumps even when they were covered with snow. Experience has shown that the most successful way of combating such a fire is to overhaul the dump by digging trenches with a tractor or steam shovel, and to use a hose stream horizontally. This method has been successful in a dump fire where enormous quantities of used rubber smoldered for several months causing a nuisance in two or more municipalities.

Piggeries have caused considerable difficulty in various suburban municipalities, but the cause is largely with the owner rather than with the swine. If the piggery is suitably isolated and properly controlled, the offensive odors are not likely to cause complaint. It is desirable that the piggery be located on isolated land having a southern exposure where the underlying soil is reasonably porous. An adequate water supply for cleaning should be provided and properly ventilated buildings of substantial construction, preferably painted white and well lighted, should be used. Feeding platforms should be on skids so that they can be readily moved and the ground about the earlier location should be plowed in. A bin for receiving the garbage should be provided and this should be covered during the warm weather. Garbage cans, wagons, and trucks should be thoroughly washed before they are taken away. Uneaten garbage and manure should be composited with earth and care should be taken when this material is used for fertilizer to plough it into the ground as soon as possible.

The rules and regulations adopted by the Massachusetts Department of Public Health for protecting sources of public water supply provide that no piggery shall be located or maintained within 50 ft. of any source of water supply or tributary thereof nor within 250 ft. thereof unless suitable and adequate provision is made to prevent any polluting matter from flowing or being washed into the water supply.

Many of the Massachusetts municipalities have rules and regulations under which swine may be kept only by a permit of the local board of health, which may be revoked at any time for cause.

The keeping of swine has been determined by the Massachusetts Supreme Court as an offensive trade. Others are listed below:

Rendering works
Soap works
Slaughter houses
Oil refineries
Fish handling plants
Glue works
Gas works
Liquor distilleries
Breweries
Abattoirs
Tanneries
Varnish works
Rubber works
Smelters

In the control of offensive trades, the sanitary inspector should aim to regulate rather than to destroy excepting in the comparatively few instances where the business must be absolutely prohibited. Most offensive trade odors can be destroyed by burning under the boilers, by scrubbing with water, or by treatment with chlorine. The Cottrell Electrical Precipitation process whereby solid or liquid particles carried in suspension are removed from gases by a strong electric current has been successful with many industrial odors.

The most important apparatus to determine an odorous nuisance is the human nose used with sufficient patience, and it has been said that a normal person can detect one gram of hydrogen sulphide in 1,000,000,000,000 c.c. of air while mercaptans can be detected 25 times more readily.

Hiscock[9] gives a budget for the Bureau of Sanitation in a municipality of 100,000 population, to consist of a director, three district inspectors and a clerk with maintenance at a total of 9 to 11.6 cents per capita per year. He states[10] that according to present standards there may be expected 3,000 sanitary inspections and reinspections per 100,000 population per year with abatement in 80 per cent of the cases.

The Massachusetts law on nuisances, General Laws, Chapter 111, Section 122, which was first adopted in partial form at least in 1797, makes the following provision:

"The board of health shall examine into all nuisances, sources of filth, and causes of sickness within its town, or on board of vessels within the harbor of such town, which may, in its opinion, be injurious to the public health, shall destroy, remove, or prevent the same as the case may require, and shall make regulations for the public health and safety relative thereto and to articles capable of containing or conveying infection or contagion or of creating sickness brought into or conveyed from the town or into or from any vessel. Whoever violates any such regulation shall forfeit not more than one hundred dollars."

It is interesting to note that the local board of health is *directed* to examine into all nuisances and *shall* destroy, remove, or prevent the same. The Massachusetts law makes no provision for an appeal from the local board of health to the State Department of Public Health, but Section 141 provides that—

"Whoever is aggrieved by the neglect or refusal of the board of health to pass all proper orders abating a nuisance, in accordance with any provision of sections one hundred and twenty-two to one hundred and thirty-nine, inclusive, may apply to the county commissioners, who may hear and determine such application and exercise in such case all of the powers of said board. The applicant shall, within twenty-four hours after such neglect or refusal, file with said board a written notice to the adverse party of his intention so to apply to the county commissioners, and within seven days after the filing of said written notice shall present a petition to one of the County Commissioners, stating the grievance complained of and the action of the board of health thereon or the neglect or refusal of said board to act thereon, as the case may be." (Chapter 278 of the Acts of 1937).

Hiscock[11] points out that the sanitary inspector should strive for a close working relationship between his department and the building and plumbing departments. The collection and disposal of garbage and refuse like the collection and disposal of sewage should be handled by one of the engineering departments of the city rather than by the health department, though the health department, which will doubtless receive most of the complaints due to faulty garbage collection and inadequate sewerage, should be familiar with the procedure as carried on by the engineering department, and should have a hand in preparing the rules and regulations under which the garbage is collected and disposed of.

The collection and disposal of sewage and the distribution of a safe water supply obviously have a more vital relation to the prevention of sickness than does the collection and disposal of garbage and refuse. The writer, in 1932, pointed out that the cost of refuse and garbage disposal for 39 cities in 1930 exceeded the total expenses of the 39 health departments by 12 per cent, and that in 15 of the larger municipalities the refuse and garbage collection and disposal costs in 1930 were 93 per cent of the entire expenses for public health in these municipalities.

Water works are financed on a quantity consumed basis, and in an increasing number of municipalities the use of sewers is paid for on an annual rental basis determined by the amount or character of sewage discharged—which in most instances is a proportion of the water bill based on definite measurements. A service charge based upon the quantity or weight of refuse and garbage collected by the municipality would appear to be a matter for consideration. A board of health in attempting to increase its budget for garbage and refuse collection is likely to be faced with the problem of reducing its budget for more important health activities which should not be curtailed. A service charge would overcome this difficulty.

The late Dr. George H. Bigelow, stated at the meeting of the Massachusetts Association of Boards of Health, that boards of health in certain Massachusetts municipalities were ordering tuberculous patients out of sanatoria at the end of short periods and in some cases refusing to admit new patients, while these same boards of health were spending lavishly to collect garbage, refuse, and ashes which, he stated, have no relation to disease or health, at least in the northern part of the country. The question of paying for garbage and refuse collection service on a quantity or weight basis rather than from the tax levy might also have the effect of cutting down the quantity particularly of garbage, as has been experienced with water when it has been metered.

Perhaps the most important work for the sanitary inspector is that of education. Progress cannot be made any faster than demanded by the public, and the greatest satisfaction in an educational campaign on the improvement of sanitary conditions undoubtedly relates to the adoption of suitable means for garbage and refuse disposal and the extension of municipal water supply and sewerage systems. Therefore, every opportunity should be used to secure the completion of the municipal water distribution and sewerage systems and the adoption of suitable means of garbage and refuse disposal.

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MOSQUITO CONTROL IN MASSACHUSETTS*

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Now that the warm weather has again arrived, the general public, man, woman, and child, in practically all corners of Massachusetts, will begin to complain about the mosquito nuisance. These remarks do not relate to the use of citronella and other palliatives, but it may be of interest to refer to some of the work which has been carried on by the State, that which is now being carried on and what might be done by individuals in an attempt to control this nuisance.

Mosquitoes have been a decided pest, especially along the seacoast areas where the salt marshes were formerly extensive breeding areas, but in 1930 extensive control work was undertaken on Cape Cod and on the islands under local appropriations and private contributions. This work was so successful that State appropriations were made in 1931 for using the unemployed in digging mosquito control drainage ditches under the direction of the State Reclamation Board. The method of mosquito control in coastal areas consists of digging ditches in the salt marshes about 10 inches wide and 2 feet deep for the purpose of draining standing water on the ebb tide and permitting small fish which feed on mosquito larvae to enter on the flood tide. As a result of these appropriations, a total of somewhat over 4,000 miles of mosquito ditches have been dug, largely in the salt marshes in the seacoast cities and towns, and the local residents state that there has been a great improvement in the mosquito nuisances in such areas. In fact, we have been informed that where it was impossible to live near certain infested areas before they were ditched, one can now live there comfortably.

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* Health Forum Release No. 498.

This work has been a worth-while form of activity for unemployed labor. The work carried on under the State appropriations is of permanent character, in that the law provides for the maintenance of this work from year to year under local appropriations. At the present time some 115 men are engaged in the annual maintenance of the mosquito control ditches along the Massachusetts coastal area. There have been no State appropriations for mosquito control work since 1933 other than small appropriations for the maintenance of the State Reclamation Board. Representatives of the board oversee the maintenance work and advise on new mosquito control work including many W.P.A. mosquito control projects.

It is probably impracticable for individuals to attempt to carry on any extensive mosquito control drainage work, but nevertheless there is much that can be done by individuals in controlling mosquitoes in their immediate neighborhood. Mosquitoes lay their eggs in standing water or in places where they intuitively know that there will be standing water, and in this season of the year they emerge from the water in the adult form in from five to eight days. Salt marsh mosquitoes are known to fly forty miles, and longer flights have been reported. The fresh water or house mosquito stays nearer home. Mosquitoes do not breed in grass but do breed in standing water; hence it behooves the individual to watch rain barrels, bird baths, faulty eave troughs, cans, broken crockery which may hold water, and the like. By concerted action in preventing any standing water which means a weekly examination and one following every storm, a marked improvement in the house mosquito nuisance can be effected. Where standing water cannot be eliminated, the breeding of mosquitoes can be controlled by frequently applying oil to the surface of the water. Ordinary range oil may be used.

The spread of encephalomyelitis, both the equine and human variety, which was referred to in the press last summer, may have resulted from the bites of mosquitoes. Hence during the winter the Department of Public Health petitioned the Legislature and has secured an appropriation to enable it to make a thorough study of the prevalence, variety and distribution of mosquitoes in Massachusetts. Under this study some 100 collectors are being engaged through a W.P.A. project and in addition ten entomologists and other scientists are to be engaged to examine the specimens obtained by the W.P.A. collectors. These collectors are to visit every section of the State, and by this means it is hoped that definite information may be obtained as to the species and distribution of mosquitoes in Massachusetts. Any resident of the State can make a definite contribution to this survey by enlisting as a voluntary collector.

Information as to this survey can be obtained from your local Board of Health.

While this study in itself will have nothing to do directly with the control of mosquitoes, the State Reclamation Board at Room 136 State House will, if requested, advise individuals as to suitable control measures.

MAINTAINING SUITABLE AIR CONDITIONS*

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Massachusetts Department of Public Health

We learn from biology that the human being is much like the lower animals and in many respects like the plants. To live, we must have plenty of air, water and food. Unlike most forms of life, we are not content to take things as we find them but must set up our own environment to provide those essentials of life which are not made available in just the form we desire. In other words, we must help nature. To obtain fresh air under adverse circumstances, to make available an ample supply of water and to dispose of those wastes common to life are the problems of the sanitary engineer. His duties relate to environmental control.

Approved air conditioning is a problem for the ventilating engineer, so far as the mechanics of the problem are involved, but it is for the sanitary engineer to decide as to the temperature, moisture and quality of the air which should be maintained, and in this connection the Department of Public Health has adopted certain standards relative to air conditions to be maintained in schools, auditoriums and other places where the public may assemble indoors and where some artificial means must be provided. Briefly, these standards require that the condition of the air in occupied spaces, in which the only source of contamination is the occupant, shall be maintained at all times during occupancy at a comfortable "effective temperature."

The effective temperature shall range between 64 degrees and 69 degrees when heating or humidification is required, and between 69 degrees and 73 degrees when cooling or dehumidification is required. It is desirable that the relative humidity shall not be less than 30 per cent nor more than 60 per cent in any case.

These effective temperatures shall be maintained at a level of 36 inches above the floor.

The air in such occupied spaces shall be at all times free from toxic or disagreeable gases and fumes and shall not contain odors and dust in objectionable amounts.

The air in such occupied spaces shall be in sufficient motion to maintain a reasonable uniformity of temperature and humidity, but not such as to cause objectionable drafts in any occupied portion of such spaces. (An air motion of more than 50 feet per minute within range of effective temperature prescribed is ordinarily considered objectionable.)

The air in all rooms and enclosed spaces shall, under the provisions of these requirements, be distributed with reasonable uniformity.

The quantity of air used to ventilate the given space during occupancy shall always be sufficient to maintain the standards of air temperature, air quality, air motion and air distribution. Sufficient air to meet these standards should be taken from an unpolluted outdoor source through a window or other opening supplied with air of suitable quality unless effective means for the removal of objectionable odors and impurities are used.

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* Health Forum Release No. 450.

Experiments carried out at the School of Public Health at Harvard University under the direction of Mr. C. P. Yaglou have shown that the average American adult with average methods of personal hygiene requires a minimum of 15 cubic feet per minute of fresh air per person in order to dilute the odoriferous matter to a concentration that is not objectionable to persons entering the room from the outside standard air.

Yaglou also found that unwashed circulated air has little or no effect on odor intensity and that it is the quantity of outdoor air which is important in this regard. Washed air, however, in a recirculating system was found to remove an appreciable portion of the odoriferous matter and reduce to some extent the fresh air requirement.

The Harvard School of Public Health has investigated the bacterial condition of air under various conditions, and the results of these investigations indicate that, contrary to current opinion, it is possible to inoculate air by droplet nuclei from persons occupying the room through sneezing operation and for some of these nuclei in the air to be taken into the human system through the respiratory organs. In connection with this investigation the air was inoculated with certain types of bacteria in the room in which the experiments were conducted, and these organisms "catapulted" into the air as minute droplets remained suspended as dropped nuclei and were swept where currents picked them up into all parts of the building in which the experiments were carried out.

Book Note

SUPERVISION IN PUBLIC HEALTH NURSING by Violet H. Hodgson. 388 pp.
New York. The Commonwealth Fund. 1939.

This is a valuable addition to the bibliography on public health nursing. The subject is presented clearly; it is comprehensive and is of great assistance both to nurses and nurse-employing agencies in interpreting nursing organization and activities.

REPORT OF DIVISION OF FOOD AND DRUGS

(As required by General Laws, Chapter 111, Section 25)

During the months of September, October, and November, 1939, samples were collected in 153 cities and towns.

There were 752 samples of milk examined, of which 73 were below standard, from 2 samples the cream had been in part removed, and 5 samples contained added water. There were 1,104 bacteriological examinations made of milk, 901 of which complied with the requirements. There were 38 bacteriological examinations made of cream, 14 of which did not comply with the requirements; 10 bacteriological examinations of ice cream, all of which complied with the requirements; 3 bacteriological examinations of chocolate milk, 1 of which did not comply with the requirements; 33 bacteriological examinations of mattress fillings, 5 of which did not comply with the requirements; 1 bacteriological examination of an empty bottle which did not comply with the requirements; 7 bacteriological examinations of lobster, 1 of which did not comply with the requirements; and 34 samples of frozen shrimp, 28 of which showed B. Coli present in 1-10 dilution, and 6 samples showed B. Coli absent in 1-10 dilution.

There were 445 samples of food examined, 164 of which were adulterated. These consisted of 1 sample of butter which had a rancid odor; 10 samples of cider, and 1 sample of grape juice, both of which contained benzoic acid and were not so labeled; 14 samples of clams, and 1 sample of oysters, all of which contained added water; 1 sample of cream which showed a positive phosphatase; 1 sample of fillet wash water which contained formaldehyde; 1 sample of dried lima beans which contained larvae, excreta, and webs; 1 sample of maple syrup which contained cane sugar; 4 samples of sausage, 1 sample of lamb, 1 sample of liver, and 1 sample of beef, all of which were decomposed; 5 samples of hamburg, 2 of which were decomposed, and 3 of which contained a compound of sulphur dioxide not so marked; 1 sample of sirloin patties which contained sodium sulphite in excess of one tenth of one per cent; 1 sample of misbranded proprietary foods; 1 sample of pickles and relish and 1 sample of sweet relish, both of which contained benzoic acid and were not so labeled; 4 samples of scallops, and 95 samples of shrimp, all of which were decomposed; 2 samples of soft drink which contained benzoic acid, not so marked; 3 samples of soft drink wash water which were deficient in caustic alkali; 1 sample of split peas which contained one fly or moth and some worm excreta; 1 sample of vinegar which contained less than 4% acetic acid; 4 samples of bedding and upholstering materials, 1 of which contained secondhand material, not so marked, and 3 samples did not contain material as labeled; and 7 samples of bedding and upholstering materials, feathers and down, all of which did not contain filling as labeled. There were also examined for lead 63 samples of chalk and crayons, 38 of which were free from lead and 25 of which contained lead.

There were 22 samples of drugs examined, of which 3 were adulterated. These consisted of 1 sample of distilled water and 2 samples of spirit of nitrous ether, all of which did not conform to the requirements of the U. S. Pharmacopoeia.

The police departments submitted 96 samples of liquor for examination. The police departments also submitted 19 samples to be analyzed for poison or drugs, 14 of which contained heroin, 1 contained cannabis, 3 contained opium, and 1 sample was examined with negative results.

There were inspected 291 plants operated for the pasteurization of milk; 95 restaurants; 50 soft drink plants; 27 ice cream establishments; and 282 mattress establishments.

There were 81 hearings held pertaining to violations of the laws.

There were 60 convictions pertaining to violations of the laws, $1,490 in fines being imposed.

John Cashchuck of Worcester; Braley's Creamery, and the Fall River Dairy of Fall River; Ugeno Ceramicole of Natick; and Raymond Doucette and John F. Abbott of Orange; and A. H. W. Stimson of Northampton; were convicted for violations of the milk laws. The Fall River Dairy of Fall River; and A. H. W. Stimson of Northampton appealed their cases.

Manuel Almeida and Joseph Bernardo of Dartmouth; John R. Borges of Fall River; M. E. O'Neil of West Springfield; Frank Alivosek of Adams; and Ludwik Haluch, 2 cases, and John Chenier of Ludlow; were convicted for violations of the pasteurization laws and regulations. M. E. O'Neil of West Springfield appealed his case.

Braley's Creamery, Incorporated, of Fall River was convicted for misbranding.

Economy Grocery Stores, Corporation, 2 cases, and the Great Atlantic and Pacific Tea Company of Quincy; Antonia Klys of Palmer; Toren Benzion of Northboro; Charles E. Goldman, 2 cases, of Norwell; Colonial Super Market, Incorporated, Commonwealth Grocery Company, and White Star Foods, Incorporated, of Waltham; David Levine, 2 cases, and First National Stores, Incorporated of Springfield; John Moskal of Northampton; John Soja of Easthampton; Simon Kronick, Julius Kronick, and Stanley Richton, 2 cases, all of North Adams; Jacob Weiss of Ware; Benjamin Gross, William Shuman, and Terminal Market, Incorporated of Roxbury; Elias Assaf and Wladyslow Ptak of Great Barrington; and First National Stores, Incorporated, of Orange were all convicted for violations of the food laws. Elias Assaf of Great Barrington appealed his case.

Joseph H. Benjamin of Roxbury; Samuel Rothenberg of Dorchester; and Frank Wlazla of Holyoke were all convicted for violations of the drug laws. Frank Wlazla of Holyoke appealed his case.

Michael Wojtowicz of Fall River and Torah Beverage Company, Incorporated, of Cambridge were convicted for violations of the soft drink regulations.

Max Azarva and David Halberstein of Chelsea; Arthur Gadoury, 2 cases, and Edgar Gadoury, 2 cases, of Dudley; Franklin Baking Company, Incorporated, and Martin Goldberg of Springfield; and the Pilgrim Restaurant and Cafe, Incorporated, of Hyannis were all convicted for violations of the bakery laws. Pilgrim Restaurant and Cafe, Incorporated, appealed its case.

Louis Apter and Percy Byer of Hartford, Connecticut; and George L. Gershman of Worcester were convicted for violations of the mattress laws. George L. Gershman of Worcester appealed his case.

Pilgrim Restaurant and Cafe, Incorporated, of Hyannis was convicted for violation of the sanitary food law. Pilgrim Restaurant and Cafe, Incorporated, appealed its case.

In accordance with Section 25, Chapter 111 of the General Laws, the following is the list of articles of adulterated food collected in original packages from manufacturers, wholesalers, or producers:

One sample of butter which was rancid was obtained from Umberto Sfreddo of Southbridge.

One sample of pasteurized cream which showed a positive phosphatase was obtained from Barnstable County Farm of Barnstable.

One sample of grape juice which contained benzoate, not so marked, was obtained from John E. Rice of Marlboro.

One sample of dried lima beans which were infested, containing larvae, excreta, and webs were obtained from Commonwealth Grocery Company of Waltham.

One sample of maple syrup which contained cane sugar was obtained from John Vrathos of Dorchester.

One sample of split peas which contained one fly or moth and some worm excreta were obtained from Umberto Sfreddo of Southbridge.

One sample of vinegar which contained less than 4% acetic acid was obtained from Sulkin Spice Company of Boston.

Soft drinks which contained benzoic acid not so labeled were obtained as follows:

One sample each, from Mrs. Edith MacMillan of Jamaica Plain; and Torah Beverage Company, Incorporated, of Cambridge.

Cider which contained benzoic acid not so labeled was obtained as follows:

One sample each, from Washington Farm, Edward C. Gregory, and Salvatore Galluzzo all of Sudbury; Barrie Farm of Wayland; Benzoin Toren of Northboro; John E. Rice, and Joseph V. Bovaconti of Marlboro; George Stevens of Wilmington; H. McCue of Woburn; and Alfred R. Newell of Billerica.

One sample of decomposed beef was obtained from Chesley E. Jones of Boston.

One sample of decomposed lamb was obtained from Chesley E. Jones of Boston.

One sample of decomposed liver was obtained from Chesley E. Jones of Boston.

One sample of sirloin patties which contained sodium sulphite in excess of one tenth of one per cent was obtained from Subway Delicatessen, Incorporated, of Boston.

Hamburg steak which contained a compound of sulphur dioxide not so labeled was obtained as follows:

One sample each, from John Mucera of Somerville, and Harry Simon of Roxbury.

Hamburg steak which was decomposed was obtained as follows:

One sample each, from Agnes Klys of Southbridge, Elias Assaf of Great Barrington, Terminal Market, Incorporated, of Roxbury; and Legion Market, Incorporated of Roxbury.

Sausage which was decomposed was obtained as follows:

One sample each, from William Shuman of Roxbury; Umberto Sfreddo of Southbridge; Edward Ptak of Great Barrington; Samuel Grossman of Athol; White Star Market, Joseph Drapkin, and Colonial Super Market of Waltham; and First National Stores, Incorporated, Ted Posovsky, and Theodore W. Merritt of Orange.

There were 18 confiscations, consisting of 2 pounds of decomposed beef, 3 pounds of decomposed sirloin steak, 8 pounds of decomposed lamb, 80 pounds of lamb that had died other than by slaughter, 3 pounds of decomposed pork chops, 175 pounds of decomposed pork livers, 1 pound of decomposed pork sausage, 9 pounds of decomposed dry sausage, 42 pounds of veal not stamped at the time of slaughter, 2,435 pounds of decomposed shrimp, 3 pounds of wormy beans, 37 pounds of wormy lima beans, and 408 pounds of decomposed and moldy cranberries.

The licensed cold storage warehouses reported the following amounts of food placed in storage during August, 1939:—218,370 dozens of case eggs; 964,278 pounds of broken out eggs; 891,305 pounds of butter; 1,744,155 pounds of poultry; 2,387,828 pounds of fresh meat and fresh meat products; and 12,998,241 pounds of fresh food fish.

There was on hand September 1, 1939: 3,471,510 dozens of case eggs; 2,811,866 pounds of broken out eggs; 5,328,787 pounds of butter; 3,058,696 pounds of poultry; 2,904,774 pounds of fresh meat and fresh meat products; and 28,979,745 pounds of fresh food fish.

The licensed cold storage warehouses reported the following amonts of food placed in storage during September, 1939:—233,220 dozens of case eggs; 871,759 pounds of broken out eggs; 885,791 pounds of butter; 1,297,097 pounds of poultry; 1,975,074 pounds of fresh meat and fresh meat products; and 8,661,662 pounds of fresh food fish.

There was on hand October 1, 1939:—2,661,600 dozens of case eggs; 2,582,049 pounds of broken out eggs; 4,784,037 pounds of butter; 2,933,375 pounds of poultry; 2,822,450 pounds of fresh meat and fresh meat products; and 28,237,464 pounds of fresh food fish.

The licensed cold storage warehouses reported the following amounts of food placed in storage during October, 1939:—192,240 dozens of case eggs; 746,024 pounds of broken out eggs; 647,237 pounds of butter; 2,061,501 pounds of poultry; 2,219,658 pounds of fresh meat and fresh meat products; and 7,505,946 pounds of fresh food fish.

There was on hand November 1, 1939:—1,495,050 dozens of case eggs; 2,218,161 pounds of broken out eggs; 3,570,280 pounds of butter; 3,754,984 pounds of poultry; 3,378,885 pounds of fresh meat and fresh meat products; and 26,673,933 pounds of fresh food fish.

During the months of December, 1939, and January and February, 1940, samples were collected in 264 cities and towns.

There were 1,282 samples of milk examined, of which 41 were below standard, from 4 samples the cream had been in part removed, and 4 samples contained added water. There were 2,250 bacteriological examinations made of milk, 1,786 of which complied with the requirements. There were 51 bacteriological examinations made of goat milk, all of which complied with the requirements. There were 138 bacteriological examinations made of cream, 36 of which did not comply with the requirements; 25 bacteriological examinations of ice cream, 2 of which did not comply with the requirements; 1 bacteriological examination of strawberry milk drink which complied with the requirements; and 22 bacteriological examinations of mattress fillings, 4 of which did not comply with the requirements. There were also examined bacteriologically 5 empty milk bottles, 3 of which did not comply with the requirements, and 4 drainings from milk cans which were supposed to be sterilized and did not meet the requirements for sterile containers.

There were 502 samples of food examined, 94 of which were adulterated. These consisted of 1 sample of cream which was low in fat for the grade specified; 10 samples of cream cheese not conforming to the legal standard; 2 samples of cider, 1 of which contained excess lead and the other sample contained borates; 1 sample of dried peas which contained worm excreta; 3 samples of relish which contained benzoic acid and were not so labeled; 1 sample of raw pork, 1 sample of ground meat, 1 sample of veal, 13 samples of scallops, and 12 samples of shrimp, all of which were decomposed; 1 sample of liverwurst which contained in excess of 2 per cent cereal or vegetable products; 28 samples of sausage, 11 of which were decomposed, 1 sample contained a compound of sulphur dioxide not so marked, and 16 samples contained in excess of 2 per cent cereal or vegetable products; 4 samples of hamburg steak, 1 of which contained sodium sulphite in excess of one-tenth of one per cent, 2 samples were decomposed, and 1 sample contained a compound of sulphur dioxide not so marked; 1 sample of soft drink contained sodium benzoate not so labeled; 2 samples of wash water which were deficient in caustic alkali; and 13 samples of bedding and upholstering materials, 6 of which were samples of feathers and down which did not contain the materials as specified, and 7 samples of plant and animal fibers, 2 of which contained secondhand material, and 5 samples did not contain the materials as specified.

There were 105 samples of drugs examined, of which 26 were adulterated. These consisted of 1 sample of camphorated oil, 3 samples of spirit of nitrous ether, 1 sample of tincture of iodine, 11 samples of carbolic acid, 9 samples of citrate of magnesia, and 1 sample of solution of hydrogen peroxide, all of which did not conform to the requirements of the U. S. Pharmacopoeia.

The police departments submitted 80 samples of liquor for examination. The police departments also submitted 17 samples to be analyzed for poison or drugs, consisting of 1 sample of white tablets which contained morphine sulphate, 9 samples of white powder which contained heroin, 1 sample of white powder which contained morphine, 3 samples of cigarettes which were found to be cannabis, and 1 sample of salt and 2 samples of white powder which were examined for poisons with negative results.

There were inspected 394 plants operated for the pasteurization of milk; 378 restaurants; 67 soft drink plants; 230 bakeries; 7 sausage plants; and 420 mattress establishments.

There were 127 hearings held pertaining to violations of the laws.

There were 37 convictions pertaining to violations of the laws, $725 in fines being imposed.

Sigmund Komak of Lynnfield; Sarah Ferreira of Rehoboth; Fred Morrisette of Swansea; and Frank J. Bissell of Holyoke; were convicted for violations of the milk laws.

Smead Brothers of Greenfield; Edward O'Rourke and Thomas Fitzgerald (Purity Milk Company) of Westfield; Wendell Williams of East Longmeadow; and Fairfield Farms, Incorporated, of Lynn; were convicted for violations of the pasteurization laws and regulations. Fairfield Farms, Incorporated, of Lynn, appealed their case.

Alfred Cote, 2 cases, of Chicopee, was convicted for violation of the milk grading regulations.

John Mucera and Commonwealth Grocery Company of Somerville; Sulkin Spice Company of Boston; Joseph Drapkin of Waltham; Leo Faria of Cambridge; Balkus Sausage & Provision Company, Incorporated, of Lynn; Brockton Public Market, Incorporated, of Brockton; Fall River Public Market, Incorporated, of Fall River; Chester Ploski and Bernard A. Chubet of Norwood; David Ritter, 2 cases, of Westfield; Theodore W. Merritt of Orange; and Charles Atter and Joseph Atter of Gardner; were all convicted for violations of the food laws. Fall River Public Market, Incorporated, of Fall River, and Brockton Public Market, Incorporated, of Brockton, appealed their cases.

Max Bikofsky and Nicholas Touloumzis of Boston; and Joseph Dundulis of Norwood, were convicted for violations of the bakery laws. Max Bikofsky of Boston appealed his case.

Hebert Drug Company, Incorporated, and Donat T. Le Clair of Holyoke; William S. Brosseau of Chicopee; and Robert Jameson of Springfield, were convicted for violations of the drug laws.

John Argeros of Peabody; and Abraham Simon of Chelsea, were convicted for violations of the soft drink regulations.

Wayland Manufacturing Company of Providence, R. I.; Diamond Mattress Company, Incorporated, of Woonsocket, R. I.; and United Bedding Manufacturing Company of Passaic, N. J., were convicted for violations of the mattress laws.

In accordance with Section 25, Chapter 111 of the General Laws, the following is the list of articles of adulterated food collected in original packages from manufacturers, wholesalers, or producers:

Seven samples of cream cheese not conforming to the legal standard were obtained from Conestoga Cream & Cheese Manufacturing Corporation of New York City.

One sample of piccalilli which contained sodium benzoate not so labeled was obtained from Publix Market, Incorporated, of Somerville.

One sample of dried peas which contained worm excreta was obtained from Commonwealth Grocery Company of Somerville.

One sample of soft drink which contained benzoic acid not so labeled was obtained from Nemco Beverage Corporation of Roxbury.

One sample of liverwurst which contained in excess of 2 per cent cereal or vegetable products was obtained from Cavigiola Brothers of Milford.

One sample of hamburg steak which contained sodium sulphite in excess of one tenth of one per cent was obtained from Barney Racoff of Cambridge.

One sample of hamburg steak which contained a compound of sulphur dioxide not so labeled was obtained from Joe Feller of Brockton.

Hamburg steak which was decomposed was obtained as follows:

One sample each, from Independent Beef Company of Norwood; and Growers Outlet, Incorporated, of Greenfield.

One sample of sausage which contained a compound of sulphur dioxide not so labeled was obtained from Stanley Slonka of Ludlow.

Sausage which contained in excess of 2 per cent cereal or vegetable products was obtained as follows:

Four samples from Omaha Packing Company, Incorporated, of Lowell; and 2 samples each, from Balkus Sausage & Provision Company, Incorporated, of Lynn; Cavigiola Brothers of Milford; and Eastern Provision Company, Incorporated, of Fall River.

Sausage which was decomposed was obtained as follows:

One sample each, from Brockelman Brothers, Incorporated, Arthur Boudnot, and Atler Brothers of Gardner; D. K. Brown & Sons of Agawam; Economy Grocery Stores Corporation of Springfield; Growers Outlet, Incorporated, of Greenfield; Bernard A. Chubet of South Norwood; Fall River Public Market, Incorporated, of Fall River; Brockton Public Market, Incorporated, of Brockton; Stop and Shop Market of Cambridge; and Publix Market, Incorporated of Somerville.

There were 37 confiscations, consisting of 2,645 pounds of decomposed meat; 300 pounds of decomposed beef trimmings; 50 pounds of decomposed hamburg steak; 900 pounds of decomposed pork sausage meat; 50 pounds of decomposed pork trimmings; 33 pounds of decomposed sausages; 12 pounds of decomposed frankforts; 75 pounds of decomposed salami; 50 pounds of decomposed fowl; 15 pounds of decomposed turkey; 600 pounds of decomposed butterfish; 275 pounds of decomposed haddock fillets; 450 pounds of decomposed salmon; 940 pounds of decomposed scallops; 6,203 pounds of decomposed shrimp; 60 pounds of decomposed squid; 2,109 pounds of decomposed fish; 32,000 pounds of decomposed fruits and vegetables; 425 pounds of candy; 125 pounds of chestnuts; 350 pounds of dried fruits; 1,000 pounds of dried beans; 130 dozens of doughnuts, crullers, rolls, and muffins; 60 pies; 100 loaves of bread; 35 loaves of cake; and 12,246 pounds of assorted foods which had been damaged by fire.

The licensed cold storage warehouses reported the following amounts of food placed in storage during November, 1939:—137,190 dozens of case eggs; 805,703 pounds of broken out eggs; 341,406 pounds of butter; 3,493,293 pounds of poultry; 2,438,706 pounds of fresh meat and fresh meat products; and 10,882,881 pounds of fresh food fish.

There was on hand December 1, 1939:—546,330 dozens of case eggs; 1,891,831 pounds of broken out eggs; 1,758,020 pounds of butter; 5,975,603 pounds of poultry; 4,141,583 pounds of fresh meat and fresh meat products; and 29,870,627 pounds of fresh food fish.

The licensed cold storage warehouses reported the following amounts of food placed in storage during December, 1939:—36,930 dozens of case eggs; 679,834 pounds of broken out eggs; 242,797 pounds of butter; 6,175,839 pounds of poultry; 3,718,934 pounds of fresh meat and fresh meat products; and 4,984,627 pounds of fresh food fish.

There was on hand January 1, 1940:—59,700 dozens of case eggs; 1,383,983 pounds of broken out eggs; 617,420 pounds of butter; 10,277,735 pounds of poultry; 6,299,253 pounds of fresh meat and fresh meat products; and 25,618,548 pounds of fresh food fish.

The licensed cold storage warehouses reported the following amounts of food placed in storage during January, 1940:—52,590 dozens of case eggs; 660,030 pounds of broken out eggs; 581,519 pounds of butter; 3,381,103 pounds of poultry; 3,670,718 pounds of fresh meat and fresh meat products; and 4,478,898 pounds of fresh food fish.

There was on hand February 1, 1940:—16,260 dozens of case eggs; 1,121,469 pounds of broken out eggs; 566,637 pounds of butter; 11,517,986 pounds of poultry; 7,347,988 pounds of fresh meat and fresh meat products; and 20,500,591 pounds of fresh food fish.

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Publication of this Document Approved by Commission on Administration and Finance
7M. 5-'40. D-99441.

MAY 14 1941
STATE HOUSE, BOSTON

THE COMMONHEALTH

Volume 27 July - December
No. 2 1940

School Studies

MASSACHUSETTS
DEPARTMENT OF PUBLIC HEALTH

THE COMMONHEALTH

Quarterly Bulletin of the Massachusetts Department of Public Health

M. Luise Diez, M.D., Director of Division of Child Hygiene, Editor.
73 Tremont Street, Boston, Mass.

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FOREWORD

We are presenting three studies made on school children which we believe will be of interest.

"A Study of Physical Defects in First and Eighth Grade Children of Massachusetts" was made under the guidance of Dr. Fredrika Moore, Consultant in School Hygiene. We acknowledge our gratitude to Miss Angeline D. Hamblen, who assisted us in the beginning of the study.

Mrs. Albertine P. McKellar, co-author of the "Twenty-Four Hour Study," was formerly with the Department, but has since resigned.

We hereby acknowledge our deep appreciation of the cooperation shown both by the superintendents and principals who allowed us to use their school records, and by those who gave permission for having the pupils fill out the questionnaires. We are also indebted to the supervisory nurses for their assistance in the collection of these records, and to the nutritionists for guidance.

M. Luise Diez, M.D.
Director, Division of Child Hygiene.

A STUDY OF PHYSICAL DEFECTS IN FIRST AND EIGHTH GRADE CHILDREN OF MASSACHUSETTS

By Lillian R. Freedman, A.B., and Etta Bloom, A.B., *Statisticians*

Introduction

This study was based on data obtained from the physical record cards of all children then in the eighth grade in cities and town of representative sizes in all sections of Massachusetts. Each card provided for a complete physical record of the child according to annual examinations by the school physician from the first to the eighth grades.

Since a comparison of defects in the first and eighth grades was desired, especially from the point of view of possible correction of defects made during these eight grades, it was originally planned to use only the children whose records included both a first and an eighth grade examination, but we found that we had to discard a great many cards that had one or both of those years missing. Therefore, all those were included who had an examination in either the kindergarten, first, or second grades, plus an examination in the seventh, eighth, or ninth grades. Hereafter, they will be designated as children in "Grade I" and "Grade VIII," respectively.

The final study was based on 13,740 children in 114 towns. This covers about one-third of the towns in the State, and represents almost one-fourth of the total eighth grade children in the State. In all, 22,720 cards had been received from 123 towns. However, cards from nine towns, representing about one-eighth of all the cards received, could not be used at all, either because the records were so incomplete that it was impossible to get sufficient information from them, or because the cards did not have records for both Grade I and Grade VIII. For the last reason, another third of the cards in the remaining towns had to be discarded.

Ten defects were chosen to be studied: nutrition, teeth, throat, nose, heart, lungs, orthopedic, nervous, vision, and hearing. The physical record card has in addition to the defects studied a record of the following defects: posture, scalp, skin, glands, and sometimes others. Children who had none of the ten defects studied, but who had one or more of the other defects, were kept in a separate class. There was also a record kept of children who had no defects at all.

The children were divided into two parentage groups according to the birthplace of the mother (whether native or foreign born), since it was felt that the mother had more influence than the father in bringing about correction of defects, and in the case of many defects their presence might be due to the mother's lack of knowledge or care. However, about one-eighth of the cards gave the birthplace of the child's father only, so this information was used instead. This left 2,544 cards (almost one-fifth of the total) that had to be omitted from the tables divided according to parentage groups, since the information on the birthplace of both parents was left blank on them. Of the remaining children, a little more than one-half (6,101) were in the group whose mothers were born in the United States, and a little less than one-half (5,095) were in the group whose mothers were foreign born.

Included in the study is a section in which the children were divided into groups according to the populations of the towns in which they lived; Population Group A includes cities and towns of 10,000 population or over (10,027 children), and Population Group B consists of towns under 10,000 population (3,713 children). On comparing the distribution of towns and eighth grade children in our study with that in the State as a whole, we find we have rather a good sample. We do have a somewhat larger proportion of cities and towns in Population Group A than does the State; on the other hand, the proportion of eighth grade children in Population Group A is somewhat smaller in the study than in the State as a whole.

In the larger cities and towns (Group A), the number of children whose mothers were born in the United States was just slightly higher than those whose mothers were foreign born, each being about two-fifths of the total (on the remaining cards this information was not available). In the smaller towns (Group B), over one-half of the children had mothers born in the United States, and less than one-third had foreign-born mothers (again almost one-fifth did not specify).

The defects found were classified according to severity, as follows:

"0" — normal
"1" — slight defect
"2" — moderate defect
"3" — marked defect
"Y" — irremediable defect.

So very few irremediable defects were recorded, in comparison with total defects (less than 1 in 1,000), that it was impossible to analyze them as a separate class, and they were combined with the "3's".

Although the cards that were very incomplete were discarded, it was necessary to use many imperfect ones. Only 15% of the towns we used had cards on which all the ten defects studied were completely filled out. More than half the towns, however, had cards with two or less defects incompletely filled out; and only one-fifth of the towns had more than four of the defects incompletely filled out.

The population group of 10,000 or over had a somewhat larger proportion of towns with no defects omitted on their physical record cards than those under 10,000. However, 55% of the smaller towns had only one to three defects incomplete, as against 32% of the larger towns; also, only 27% of the smaller towns had four to nine defects incomplete compared with 41% of the larger towns. This confirms the impression received while working on the records that those of the larger towns were often more poorly filled out than those of the smaller ones.

Throat, nose, nutrition, heart, teeth, and lung defects were the ones that were most often found complete, in the order given; whereas orthopedic, vision, and hearing defects, and more especially nervous defects, were fairly often partially or entirely omitted.

Below are listed a few general criticisms of the methods sometimes used in filling out the cards:

(1) Some towns check a defect only when the defect is present. This makes it difficult to ascertain whether the blank spaces mean "0" (normal), or whether the physical examination is incomplete.

(2) Cards are not always uniformly filled out according to directions on the State physical record cards. Often descriptive terms, or letters or figures not in the code, are used, and these have to be interpreted as "0", "1", "2", "3", or "Y".

(3) Some towns emphasize one particular defect, as teeth, nutrition, nervous, orthopedic, etc. This defect would be very carefully marked on each card, while the rest of the card would often give the impression of a row of "0's" quickly filled in.

Summary of Findings

A. General

1. The ten defects studied occurred in the following order of frequency in the first grade children: teeth, nutrition, throat, nose, vision, orthopedic, heart, lungs, nervous, hearing. Teeth defects were the most common ones, being found in over ⅖ of the children. The record of dental defects in all instances was part of the routine examination by the school physician. More than ⅓ of the children had nutrition defects; and just about ⅓ had throat defects. Approximately ⅙ had nose defects, and almost as many had vision defects. But only 2% or less were found to have each of the other defects studied.

When these children reached the eighth grade, the order changed somewhat, as follows: teeth, nutrition, throat, vision, nose, orthopedic, hearing, heart, nervous, lungs. In this grade, more than ¼ of the children had teeth defects, and more than ⅕ had nutrition defects. Over ⅙ were found with throat defects, ⅐ with vision defects, and 1/12 with nose defects. Only 3% or less had each of the other five defects. (See Table 1.)

2. Not quite ⅙ of the children in the first grade were found without defects; almost ⅓ of the eighth grade children had no defects.

TABLE 1.—DEFECTS IN 13,740 MASSACHUSETTS CHILDREN IN GRADES I AND VIII

Grade I

Defect	No. of Defects	% of Children with Each Defect
Teeth	5,852	42.6%
Nutrition	5,180	37.7%
Throat	4,614	33.5%
Nose	2,393	17.4%
Vision	2,174	15.8%
Orthopedic	306	2.2%
Heart	260	1.9%
Lungs	178	1.3%
Nervous	86	0.6%
Hearing	61	0.4%
Total of 10 defects	21,104	

Grade VIII

Defect	No. of Defects	% of Children with Each Defect
Teeth	3,735	27.1%
Nutrition	3,126	22.7%
Throat	2,350	17.2%
Vision	1,955	14.2%
Nose	1,168	8.5%
Orthopedic	474	3.4%
Hearing	406	3.0%
Heart	373	2.7%
Nervous	123	0.9%
Lungs	67	0.5%
Total of 10 defects	13,777	

Children with Other Defects, and Children with No Defects

Grade I

	Number	Per Cent
Children with other defects, but with none of above defects	644	4.7%
Children with no defects	2,163	15.8%

Grade VIII

	Number	Per Cent
Children with other defects, but with none of the above defects	704	5.1%
Children with no defects	4,513	32.8%

3. Teeth defects accounted for more than ¼ of the total defects in both Grade I and Grade VIII, and nutrition defects for almost another quarter, so that teeth and nutrition defects together make up about ½ of the total defects (including only the ten defects studied).

TABLE 2—PERCENTAGE DISTRIBUTION OF THE TEN DEFECTS STUDIED IN GRADES I AND VIII

Grade I Defect	Per Cent	*Grade VIII* Defect	Per Cent
Teeth	27.7	Teeth	27.1
Nutrition	24.6	Nutrition	22.7
Throat	21.9	Throat	17.1
Nose	11.3	Vision	14.2
Vision	10.3	Nose	8.5
Orthopedic	1.5	Orthopedic	3.4
Heart	1.2	Hearing	2.9
Lungs	0.8	Heart	2.7
Nervous	0.4	Nervous	0.9
Hearing	0.3	Lungs	0.5
Total of the 10 defects	100.0	Total of the 10 defects	100.0

4. There was a decrease of over ⅓ in the number of defects found (including only the ten defects studied) from the first grade to the eighth. The percentages of children with throat, teeth, nutrition, nose, vision, and lung defects decreased from Grade I to Grade VIII; those with hearing, orthopedic, and heart defects increased; and those with nervous defects showed no significant change.

TABLE 3 — INCREASE OR DECREASE IN DEFECTS IN 13,740 MASSACHUSETTS CHILDREN FROM GRADE I TO GRADE VIII

A.—DEFECTS THAT DECREASED

(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
	No. of Defects			*Decrease in* % of Children with	
Defect	Grade I	Grade VIII	No. of Defects	Each Defect	% of Defects
Throat	4,614	2,350	2.264	16.3%	49%
Teeth	5,852	3,735	2,117	15.5%	36%
Nutrition	5,180	3,126	2,054	15.0%	40%
Nose	2,393	1,168	1,225	8.9%	51%
Vision	2,174	1,955	219	1.6%	10%
Lungs	178	67	111	0.8%	62%

B.—DEFECTS THAT INCREASED

	No. of Defects			*Increase in* % of Children with	
Defect	Grade I	Grade VIII	No. of Defects	Each Defect	% of Defects
Hearing	61	406	345	2.6%	566%
Orthopedic	306	474	168	1.2%	55%
Heart	260	373	113	0.8%	43%
Nervous	86	123	37	0.3%	43%

C.—CHILDREN WITH OTHER DEFECTS, AND CHILDREN WITH NO DEFECTS

	Grade I	Grade VIII	Increase in Number	Increase in % of Children Specified in Col. (1)	Percentage Increase
Children with other defects, but with none of the above defects	644	704	60	0.4%	9%
Children with no defects	2,163	4,513	2,350	17.0%	108%

5. In Grade I, 42% of the defects were slight, 48% were moderate, and 10% were severe. The proportion of slight and severe defects increased in Grade VIII, and the proportion of moderate defects decreased: 46% slight, 40% moderate, 14% severe.

In the first grade, out of every 100 instances of each defect, over 90 of the vision, 75 of the nutrition, and almost 70 of the lung defects, were slight. About 50 of each 100 heart and nervous defects were slight, and almost 40 of each 100 orthopedic and hearing defects. More than 25 out of 100 nose defects, 20 out of 100 throat defects, and 15 out of 100 teeth defects were slight ones.

Not many of the defects were severe: hearing defects led the others, with almost 20 in each 100 marked severe; teeth followed with 15 out of 100; throat and nose came next with approximately 10 out of 100; and all the others had 5 or less severe defects per 100.

In the eighth grade, the distribution by severity of defect varies from that in the first grade. Again vision defects include the largest proportion of slight defects, though these are now less than 80 out of 100. Approximately 70 of each 100 hearing defects are slight ones, 60 of each 100 nutrition defects, and nearly as many heart defects. Slight defects make up about 50 out of 100 lung defects, almost as many nervous defects, and a little over 40 out of 100 orthopedic defects. More than 30 in every 100 teeth defects, just 30 in every 100 throat defects, and 25 in every 100 nose defects are slight.

There is now a larger proportion of severe defects than was found in the first grade: over 20 out of 100 nervous defects, about 15 out of every 100 nose, throat, teeth, nutrition, and hearing defects, and somewhat less than 10 vision defects in 100. Orthopedic, heart, and lung defects are severe not more than 5 times out of 100, in each case.

TABLE 4.—DISTRIBUTION OF EACH DEFECT INTO DEGREES OF SEVERITY IN GRADES I AND VIIII

	Grade I						*Grade VIII*					
	Number			*Per Cent*			*Number*			*Per Cent*		
	Severity of Defect			Severity of Defect			Severity of Defect			Severity of Defect		
Defect	1	2	3	1	2	3	1	2	3	1	2	3
Nutrition	3,905	1,013	262	75%	20%	5%	1,865	835	426	60%	27%	13%
Teeth	975	3,963	914	17%	68%	15%	1,234	1,915	586	33%	51%	16%
Throat	955	3,142	517	21%	68%	11%	710	1,235	405	30%	53%	17%
Nose	638	1,518	237	27%	63%	10%	290	674	204	25%	58%	17%
Heart	138	113	9	53%	44%	3%	210	150	13	56%	40%	4%
Lungs	122	56	0	69%	31%	0%	34	32	1	51%	48%	1%
Orthopedic	115	176	15	38%	57%	5%	197	255	22	41%	54%	5%
Nervous	43	42	1	50%	49%	1%	58	39	26	47%	32%	21%
Vision	2,014	129	31	93%	6%	1%	1,519	268	168	78%	14%	8%
Hearing	24	26	11	39%	43%	18%	278	76	52	68%	19%	13%
Total of 10 defects	8,929	10,178	1,997	42%	48%	10%	6,395	5,479	1,903	46%	40%	14%

B. Parentage Groups

6. The children whose mothers were born in the United States showed a better record in both Grade I and Grade VIII than those whose mothers were foreign born. Taking the total of the ten defects studied, the children whose mothers were born in the United States had 149 defects per 100 children as compared with 161 defects per 100 children for those with foreign-born mothers, in Grade I. Also, there were 17.3% of the children in the former group with no defects against 14.0% in the latter group. In Grade VIII, the children whose mothers were born in the United States had 99 defects per 100 children, and 34.1% had no defects at all; children whose mothers were born in foreign countries had 108 defects per 100 children, and 31.5% had no defects. (See Tables 5 and 7.)

In the case of individual defects, in Grade I, the greatest difference between the two groups was in teeth defects. The children in the foreign group also had significantly more throat and nose defects than the children in the native group. The one instance in which the difference between the two groups was in favor of the foreign group (and was large enough to be significant) was in the case of vision defects.

In Grade VIII, the differences between the two groups were on the whole less than in Grade I. Teeth defects were still a good deal worse in the case of the children in the foreign group than in the native one. Orthopedic defects, on the other hand, were found more frequently among the children whose mothers were born in the United States. The differences in the case of the other defects were not significant.

TABLE 5—DEFECTS IN MASSACHUSETTS CHILDREN IN GRADES I AND VIII

BY BIRTHPLACE OF MOTHER*

Per Cent of Children with Each Defect

Grade I

Defect	Birthplace of Mother U. S.	Birthplace of Mother Foreign
Teeth	40.0	46.6
Nutrition	37.2	38.7
Throat	32.3	35.3
Nose	16.6	18.9
Vision	16.4	14.4
Orthopedic	2.6	2.0
Heart	1.7	2.1
Lungs	1.1	1.4
Nervous	0.6	0.6
Hearing	0.4	0.5

Grade VIII

Defect	Birthplace of Mother U. S.	Birthplace of Mother Foreign
Teeth	24.6	31.3
Nutrition	23.8	24.4
Throat	16.6	18.1
Vision	14.0	14.3
Nose	8.2	8.9
Orthopedic	4.1	3.1
Hearing	3.4	3.1
Heart	2.5	2.7
Nervous	1.0	0.6
Lungs	0.4	0.7

Per Cent of Children with Other Defects, and with No Defects

Grade I

	Birthplace of Mother U. S.	Birthplace of Mother Foreign
Children with other defects, but with none of the above defects	5.2	4.6
Children with no defects	17.3	14.0

Grade VIII

	Birthplace of Mother U. S.	Birthplace of Mother Foreign
Children with other defects, but with none of the above defects	4.8	4.2
Children with no defects	34.1	31.5

* Birthplace of Mother—U. S.: 6,101 children
Birthplace of Mother — Foreign: 5,095 children
About ⅛ of the children included here were grouped according to the birthplace of their father instead of their mother, since the mother's birthplace was not given.

7. In the United States group, throat, teeth, nutrition, nose, vision, and lung defects all showed significant decreases from Grade I to Grade VIII. In the foreign group, the same defects, except vision, showed significant decreases.

Hearing, orthopedic, and heart defects showed significant increases from Grade I to Grade VIII in the United States group; in the foreign group, orthopedic and hearing only, showed significant increases.

The total number of defects showed large decreases in both parentage groups; conversely, the number of children with no defects increased to a great extent in both groups. (See Table 6.)

8. The improvement between the first and eighth grades in the case of most defects was about the same for the children in the native and the foreign

groups; the only significant differences were in nose and vision defects. In the former, the foreign group improved more than the native group; in the latter, it was the United States group that showed the greater improvement.

TABLE 6—INCREASE OR DECREASE IN PERCENTAGE OF CHILDREN WITH EACH DEFECT FROM GRADE I TO GRADE VIII

BY BIRTHPLACE OF MOTHER*

Decrease in Percentage of Children with Each Defect

Defects that Decreased	Birthplace of Mother U. S.	Birthplace of Mother Foreign
Throat	15.7	17.2
Teeth	15.4	15.3
Nutrition	13.4	14.3
Nose	8.4	10.0
Vision	2.4	0.1
Lungs	0.7	0.7

Increase in Percentage of Children with Each Defect

Defects that Increased	Birthplace of Mother U. S.	Birthplace of Mother Foreign
Hearing	3.0	2.6
Orthopedic	1.5	1.1
Heart	0.8	0.6
Nervous	0.4	0.0

Children with Other Defects, and Children with No Defects

	Birthplace of Mother U. S.	Birthplace of Mother Foreign
Decrease in % of children with other defects, but none of the above defects	0.4	0.4

	Birthplace of Mother U. S.	Birthplace of Mother Foreign
Increase in % of children with no defects	16.8	17.5

* Birthplace of Mother—U. S.: 6,101 children
Birthplace of Mother—Foreign: 5,095 children
About ⅙ of the children included here were grouped according to the birthplace of their father instead of their mother, since the mother's birthplace was not given.

9. The number of defects per 100 children is greater in both Grade I and Grade VIII for the children whose mothers are foreign born than those whose mothers were born in the United States, although the decrease from Grade I to Grade VIII was about the same in both groups. There was not much difference between the groups in slight or severe defects; most of the difference showed up in the moderate defects, where the foreign group had a higher ratio than the native one.

TABLE 7 — RATIO OF DEFECTS* IN EACH PARENTAGE GROUP TO NUMBER OF CHILDREN IN THAT GROUP

BY SEVERITY OF DEFECT

Grades I and VIII, and Increase or Decrease from Grade I to Grade VIII

	*Birthplace of Mother**—U.S.*			*Birthplace of Mother**—Foreign*		
Severity of Defect	No. of Defects per 100 Children Grade I	No. of Defects per 100 Children Grade VIII	Increase or Decrease in No. of Defects per 100 Children	No. of Defects per 100 Children Grade I	No. of Defects per 100 Children Grade VIII	Increase or Decrease in No. of Defects per 100 Children
1	63	45	—18	65	47	—18
2	72	40	—32	82	46	—36
3	14	14		14	15	+ 1
Total	149	99	—50	161	108	—53

* Included are only the ten defects studied: nutrition, teeth, throat, nose, heart, lungs, orthopedic, nervous, vision, and hearing

** Birthplace of Mother—U. S.: 6,101 children
Birthplace of Mother—Foreign: 5,095 children.
About ⅙ of the children included here were grouped according to the birthplace of their father instead of their mother, since the mother's birthplace was not given.

C. Population Groups

10. In the larger cities and towns, there were found 147 defects per 100 children (including only the ten defects studied) in Grade I; whereas, there were 171 defects per 100 children in the smaller towns. In Grade VIII these figures were 98 defects per 100 children in Population Group A, and 107 defects per 100 children in Population Group B. Although the smaller towns were worse in both cases, the percentage of improvement from Grade I to Grade VIII was greater than in the larger towns.

TABLE 8—NUMBER OF DEFECTS* PER 100 CHILDREN AND PERCENTAGE CHANGE FROM GRADE I TO GRADE VIII

BY SEVERITY OF DEFECT AND BY POPULATION GROUPS

	Number of Defects per 100 Children								*Percentage Increase or Decrease in No. of Defects per 100 Children from Grade I to Grade VIII*			
	Grade I				*Grade VIII*							
		Severity of Defect				Severity of Defect				Severity of Def.		
Population Group	Total	1	2	3	Total	1	2	3	Total	1	2	3
A	147	62	72	13	98	46	38	14	—33%	—26%	—47%	+ 8%
B	171	74	79	18	107	49	46	12	—37%	—34%	—42%	—33%
Total	154	65	74	15	101	47	40	14	-34%	—28%	—46%	— 7%

* Includes only the ten defects studied.

The schools in Population Group B spent, on the average, ⅛ more per capita for school health work than those in Population Group A; and the percentage of improvement in defects from Grade I to Grade VIII happens to be also ⅛ greater in the smaller towns than in the larger ones.

11. In Grade I, the percentages of children with the following defects were significantly higher in Population Group B than in Population Group A: nutrition, throat, nose, heart, orthopedic, nervous, and vision. By the time they have reached Grade VIII, only throat, nose, orthopedic, and nervous defects are significantly higher in Population Group B than in Population Group A; and nutrition, teeth, and hearing defects are significantly lower in Population Group B than in Population Group A.

TABLE 9—DEFECTS IN 13,740 MASSACHUSETTS CHILDREN IN GRADES I AND VIII

BY POPULATION GROUPS

Per Cent of Children with Each Defect

Grade I

	Population Group	
Defect	A	B
Teeth	42.3	43.3
Nutrition	36.3	41.3
Throat	31.7	38.6
Nose	16.5	20.0
Vision	15.1	17.7
Orthopedic	1.6	4.0
Heart	1.6	2.5
Lungs	1.2	1.5
Nervous	0.5	1.1
Hearing	0.5	0.3

Grade VIII

	Population Group	
Defect	A	B
Teeth	27.8	25.4
Nutrition	24.0	19.3
Throat	15.1	22.5
Vision	14.0	14.9
Nose	7.5	11.3
Hearing	3.6	1.2
Heart	2.6	2.9
Orthopedic	2.2	6.9
Nervous	0.6	1.8
Lungs	0.4	0.8

Table 9 (Continued)

Per Cent of Children with Other Defects, and with No Defects

Grade I

	Population Group	
	A	B
Children with other defects, but none of the above defects..	4.9	4.2
Children with no defects	16.1	14.8

Grade VIII

	Population Group	
	A	B
Children with other defects, but none of the above defects	5.3	4.7
Children with no defects	32.3	34.3

12. In Population Group A, throat, teeth, nutrition, nose and lung defects showed significant decreases from Grade I to Grade VIII; in Population Group B, the same defects showed significant decreases, with the addition of vision defects.

Hearing, heart, and orthopedic defects showed significant increases from Grade I to Grade VIII in Population Group A; in Population Group B, only orthopedic and hearing defects showed significant increases.

The percentage of children with no defects increased significantly in both groups from Grade I to Grade VIII.

TABLE 10—INCREASE OR DECREASE IN PERCENTAGE OF CHILDREN WITH EACH DEFECT FROM GRADE I TO GRADE VIII

BY POPULATION GROUPS

Decrease in % of Children with Each Defect

Defects that Decreased	Population Group	
	A	B
Throat	16.6	16.1
Teeth	14.5	17.9
Nutrition	12.3	22.0
Nose	9.0	8.7
Vision	1.1	2.8
Lungs	0.8	0.7

Increase in % of Children with Each Defect

Defects that Increased	Population Group	
	A	B
Hearing	3.1	0.9
Heart	1.0	0.4
Orthopedic	0.6	2.9
Nervous	0.1	0.7

Increase in Percentage of Children with Other Defects, and with No Defects

	Population Group	
	A	B
Children with other defects, but with none of the above defects	0.4	0.5
Children with no defects	16.2	19.5

13. The increase in the percentage of children with no defects was significantly greater in the smaller towns than in the larger ones. The decrease between the two grades was significantly greater for the smaller towns in the case of nutrition, teeth, and vision defects. Also, the increase between the two grades was significantly less for the smaller towns in the hearing and heart defects. However, the increase in orthopedic defects was significantly greater in Population Group B than in Population Group A. In general, Population Group B showed a greater improvement between Grade I and Grade VIII than Population Group A.

A TWENTY-FOUR HOUR ACTIVITY STUDY OF HIGH SCHOOL CHILDREN IN MASSACHUSETTS

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Groups Chosen for Study

Towns Participating

Some seven thousand high school boys and girls answered unsigned questionnaires indicating their activities during the twenty-four hours of a school day. They were asked what they did before breakfast, after school and following the evening meal and the time they got up and went to bed. Sample questionnaires are shown at the end of the paper, filled out for the average boy and girl.

The high schools were chosen to represent the city, the large town and the small town.

Group I — Cities of 20,000 to 50,000 (3 cities)
Group II — Towns of 5,000 and over (7 towns)
Group III — Towns under 5,000 (10 towns).

The comparatively small number of freshmen in Group I and Group II (especially in Group I) is due to the fact that some of the towns have three-year senior high schools (sophomore, junior, and senior classes).

For the numerical distribution of the children by population, sex and class, see the following chart:

DISTRIBUTION OF CHILDREN BY POPULATION GROUPS, SEX, AND CLASS

Population Group		*Number of Children*		
		Boys	Girls	Total
Population Group I	Freshman	123	123	246
	Sophomore	475	636	1,111
	Junior	356	412	768
	Senior	341	361	702
	Total I	1,295	1,532	2,827
Population Group II	Freshman	345	345	690
	Sophomore	393	389	782
	Junior	311	360	671
	Senior	254	308	562
	Total II	1,303	1,402	2,705

Population Group III	Freshman	181	212	393
	Sophomore	121	172	293
	Junior	134	161	295
	Senior	93	103	196
	Total III	529	648	1,177
Total	Freshman	649	680	1,329
	Sophomore	989	1,197	2,186
	Junior	801	933	1,734
	Senior	688	772	1,460
	Total	3,127	3,582	6,709

Population Groups

Included in the study are 9% of the towns in the State having high schools, 8% of the high schools and 4% of the pupils.

DISTRIBUTION OF TOWNS BY POPULATION GROUPS

Population Group	*Per Cent of Towns*	
	State	Study
Group I	17	15
Group II	36	35
Group III	47	50
Total	100	100

Grouped by Sex

The study is about evenly distributed between boys and girls, although there is a somewhat greater percentage of girls than boys in each group. In the State high schools as a whole, there is also a slightly greater number of girls than boys, but the difference is somewhat greater in the study.

SEX DISTRIBUTION (IN PER CENT)

Population Group	*Sex*	*State*	*Study*
Group I	Boys	49	46
	Girls	51	54
Group II	Boys	48	48
	Girls	52	52
Group III	Boys	47	45
	Girls	53	55
Total	Boys	49	47
	Girls	51	53

Rising Time

Just before seven o'clock is the rising time for the Massachusetts boys and girls studied. There is only slight variation in the getting-up time between the boys and girls or among the classes, though the children in the lower classes get up slightly earlier.

Activities Between Rising Time and Breakfast

About ½ of the high school students have no activities before breakfast—53% of the girls and 50% of the boys indicated that they did not work at home or outside the home, did not study or play before the morning meal.

Work at Home

Almost as many boys (28%) as girls (31%) work in the home before breakfast. As they grow older, fewer of them have home responsibilities before eating the morning meal (36% of the freshman boys work, compared to 22% of the senior boys; and 33% of the freshman girls, compared to 26% of the senior girls). More boys and girls who live in the small towns work before breakfast than those in the cities (34% of the boys in the country, compared to 20% in the city). Only ⅔ as many city girls as girls in the small towns work in the home before their breakfast.

Work Outside Home

Few high school boys and girls work away from the home before breakfast (11% of the boys and just 2% of the girls), and almost twice as many boys living in the country as those living in the city have duties outside of the home at this time. Of the small town girls, 3% work outside the home before breakfast but only 1% of the city girls. Of the freshman and sophomore girls, 2% have outside responsibilities and only 1% of the juniors and seniors.

Study

Before breakfast 17% of the boys and 18% of the girls study, and this figure varies very little for the small town, the city, the freshman, or the senior.

Play

Very few high school pupils play before breakfast—5% of the boys and 3% of the girls.

Activities Between School Dismissal and Evening Meal

Work at Home

Nearly half of the high school boys and girls work in the home after school before the evening meal (48% of the girls and 44% of the boys). With the exception of the freshman boys, more girls reported that they did home duties than did the boys. In all four classes the small town boys and girls have more home duties than those in the city. The total percentages are 50% boys, 53% girls in the country; compared to 38% boys, and 44% girls in the city.

Work Outside the Home

This study represents activities during a particular school day and does not include a day during the week-end—consequently the work outside of the home does not take into consideration those children who work on Saturdays or any other day but the one considered.

More city boys work outside of the home after school (43%) than work in their homes (38%). Of all the girls 12% work away from home, while 41% of the boys have outside duties.

Study

Many more girls (59% of the total) than boys (35%) study after school before the evening meal. These percentages of children who reported studying in the afternoon varied little from class to class—although the junior girls (61%) and the freshman boys (38%) showed the largest percentages. More city and large town high school pupils in each class evidently study in the afternoon than those in the smaller towns—perhaps because the city high school often dismisses earlier.

Recreation

Although this study was made during lovely spring days, only 35% of the girls stated that they took a walk in the afternoon, and 28% of the boys. These percentages were not very different for all classes and for the three groups. Nearly half (46%) of the boys indicated that they played out-of-doors and 25% of the girls. Only 5% of the boys and 4% of the girls played indoors.

Only 37% of the girls and 32% of the boys read in the afternoon before supper. Fewer seniors than freshmen read or play during this period of the day.

A small percentage (5% of boys and 4% of girls) go to the movies in the afternoon on a school day—exactly the same percentage that reported they played indoors. There is little difference in movie attendance in the classes or between the city and rural boys and girls.

Forty-five per cent of the girls and 40% of the boys listen to the radio after school before the evening meal. The percentage of children listening to the radio decreases from the freshman to the senior year. While about the same number of boys listen to the radio in the country and in the city, 14% more of the girls in the country listen in than do the girls in the city.

Rest

Just 14% of the girls and 18% of the boys rest after school before the evening meal.

Other Things

Forty per cent of the boys and 38% of the girls said that they did "other things," not listed on the questionnaire, during the afternoon.

Activities After Evening Meal

Work

Not as many high school girls and boys work after the evening meal as before. Thirty-four per cent of the girls and 26% of the boys indicated that they helped after supper — while 48% of the girls and 44% of the boys work after school before supper. Fewer high school students work outside of the home in the evening (19% of the boys and 6% of the girls) compared to those working in the afternoon (41% of the boys and 12% of the girls).

Study

A larger number of high school pupils study in the evening than in the afternoon (53% of the boys, 63% of the girls)—and more girls than boys study outside of school at any time.

Recreation

About the same number said they walked in the evening (30% boys and 31% girls) as did in the afternoon. And twice as many boys as girls play outdoors in the evening (35% boys and 18% girls), just as the figures showed for outdoor play in the afternoon (46% boys, 25% girls).

Again, few are playing indoors in the evening—6% boys, 4% of the girls—with the country groups showing the higher percentages.

Of the boys and girls 33% are reading in the evening—about the same percentage as in the afternoon. More read in the evening in the country (37% boys, 41% girls) than in the city (31% boys, 29% girls).

Nearly 1 out of 10 boys and girls (9% of each) go to the movies on school nights. Movies in the country are more popular in the evening than in the city; in the afternoon, however, approximately the same percentage attend in both the city and the country. Forty-four per cent of the boys and 46% of the girls indicated that they listen to the radio during the evening—about the same percentage that listen before supper. More listen to the radio in the country both in the afternoon and evening.

Rest

About the same small number of high school boys and girls reported that they rest after dinner (18% boys, 11% girls) as do during the afternoon.

Other Things

Almost exactly the same percentage of boys and girls checked "other things" for activities after dinner (40% boys, 42% girls), although 4% more girls find necessary "other things" to do in the evening compared to the afternoon.

Retiring Time

Just a few minutes past ten o'clock is the retiring time of the high school group studied. As the boys and girls progress through high school, their bedtime grows later (freshman girls 9:37, senior 10:28—freshman boys 9:44, senior 10:39). The Group II boys and girls go to bed earliest, the country children go to bed about ten minutes later, and the city boys and girls go to bed latest of all—(about half an hour after the Group II children).

10:00 P.M. or Before

About three-fifths of the boys (58%) and girls (62%) retire at 10:00 P.M. or earlier on a school night. Just under half (48%) of the city boys go to bed at 10:00 or before, compared to 60% of the boys in the country towns. About the same difference exists between the country and city girls; 51% in the city and 66% in the country stated they went to bed at 10:00 P.M. or before.

After 10:00 P.M.

There were 42% of the boys and 38% of the girls in the group retiring after 10:00 P.M. The later bedtimes were more frequent among the city boys and girls (52% of the city boys compared to 40% of the country boys, and 49% of the city girls compared to 34% of the country girls).

Midnight or After

On a school night 6% of the boys and 4% of the girls stayed up until midnight or later. These percentages were higher (8% boys, 6% girls) in the city than in the country (5% boys, 4% girls). As both boys and girls progress from freshman to senior years, the percentage retiring at midnight or later increases from 2% freshman boys to 11% of senior boys and from 1% of the freshman girls to 7% of the senior girls.

Amount of Sleep

The average amount of sleep for boys studied was 8 hours and 45 minutes on a school night, and for the girls 8 hours and 52 minutes.

The amount of sleep grows less as high school boys and girls grow older, as a natural result of having later bedtimes from freshman through senior years —the freshman boys having 44 minutes more than the seniors, and the freshman girls 47 minutes more.

Country boys have 14 minutes more sleep than city boys, and girls in the city sleep 24 minutes less than girls living in the small towns.

Length of Time to Fall Asleep

We asked the question: "How long after retiring do you fall asleep?" because there were some of us who had the impression that many high school boys and girls were lying awake for long hours unable to go to sleep for various reasons.

Among the boys in the study, the average amount of time to fall asleep was 22 minutes, and for the girls 24 minutes—with very little difference between the population groups or among the classes in the high school.

Outside Lessons and Clubs

Neither Clubs nor Lessons

More than half of the high school students (57% boys, 54% girls) belong to no outside club and take no special lessons such as piano, vocal, dancing, bridge, sewing, etc. More country boys and girls have outside-of-school interests. Freshman girls and boys have more clubs and lessons than sophomores, sophomores more than juniors, and juniors more than seniors.

Clubs

Nearly two-thirds of the high school group (65% of the boys, 66% of the girls) do not belong to outside clubs—and the country evidently offers more opportunity for outside-of-school groups than the city. There is little difference in the percentages belonging to clubs between boys and girls and among the classes, though fewer seniors than freshmen belong to clubs.

Two per cent of the boys, 4% of the girls belong to the 4-H Clubs; 9% of the boys and 5% of the girls are Scouts; and 4% of both boys and girls belong to other clubs. More boys and girls in the country belong to 4-H Clubs or Scout Troops than in the cities. Twenty-one per cent of the boys and 22% of the girls did not indicate to what specific club they belonged.

Outside Lessons

Over ⅘ of the high school children take no lessons outside of school, and approximately that percentage is maintained throughout the four classes and in the three groups. Eighty-four per cent of the boys and 78% of the girls indicated that they took no lessons. Music lessons account for 4% of the boys and 6% of the girls; dancing for 3% of the girls and only 1% of the boys. Eleven per cent of the boys and 13% of the girls did not specify what sort of lessons they took.

Study of the Whole Day's Activities

Activities of the day as a whole are described here, whereas previously in the study we have considered activities of particular times of the day—before breakfast, after school and after the evening meal.

Work

More than one-fourth of the high school girls and about one-fifth of the boys reported that they did no work at all during the day, either at home or outside. Fewer city boys and girls indicated that they worked than those in the country. More girls work in the home—65%, compared to 58% for the boys. As boys and girls grow older fewer work at home, as the figures show more freshmen than seniors working at home. Rather surprisingly this same situation exists for the boys who work outside of the home—more freshmen than seniors do outside work, while about the same percentage of the girls work away from home during the four-year high school period. Forty-seven per cent of the boys, and 15% of the girls work outside the home.

Nearly 1 out of 10 girls and 1 out of 4 boys work both in the home and outside. For the boys the percentage decreases from freshman to senior years, and for the girls it stays about the same. In every year in high school, a greater percentage of those who live in the country than in the city work both at home and outside.

Work in Combination with Other Activities

Eight out of 10 boys and 7 out of 10 girls work sometime during the day. Two and four-tenths per cent of the boys and 0.4% of the girls said that their only activity was work. The city boys showed the highest percentage of children who indicated that they did not include during their daily activities recreation, study, or rest, or any combination of these, but stated that their only activity was work. The percentage of city boys who reported that they did nothing (outside of school) but work on this particular day increased from 1.6% in the freshman year to 4.4% in the senior year.

Thirty-eight per cent of the boys and 46% of the girls combine their work with recreation and study during the day, but those figures are cut to less than one-half as much for boys (17%) and to less than one-third as much for girls (14%) when we consider those children who add rest to the combination of work, recreation and study.

Recreation

About one out of 15 boys (7%) and one out of 20 girls (5%) have no recreation. This percentage increases from the freshman to the senior year for both boys and girls. More city boys and girls indicated that they had no recreation than country children. A smaller group indicated that recreation was their only activity than stated they had no recreation.

Of the girls, 77% had recreation indoors compared to 64% outdoors. More girls in the country than in the city indicated that they had recreation, both indoooors and outdoors.

Nearly the whole group (93% boys, 95% girls) have some recreation during the day.

Recreation in Combination with Other Activities

Almost all the children had some form of recreation during the day; usually the recreation was in addition to other activities, as only 4% of the boys and 3% of the girls reported recreation only. The most popular combination of recreation was with work and study (38% boys, 46% girls).

Study in Combination with Other Activities

A large majority of both boys and girls study—only 12% of the girls and 28% of the boys indicated that they didn't. More girls in all classes study than boys. As the boys advance from the freshman to the senior year fewer study, while practically the same per cent of girls study right through the four years.

Just 0.6% of the girls and 0.1% of the boys reported that their only activity was study—one out of 10 boys and one out of 5 girls study and have some form of recreation, but do not work or rest.

Rest in Combination with Other Activities

About one out of 4 boys and one out of 5 girls rested during the 24 hours of the day the study was made. One and two tenths per cent of the boys and 0.6% of the girls combined rest with recreation for their only activities—omitting study and work. The combination of activities with rest, work, recreation and study came to 17% of the boys and 14% of the girls.

Some Conclusions

Boys Versus Girls

Nearly as many boys as girls help at home before breakfast.

Over 3 times as many boys as girls work away from home after school.

More girls work at home—before breakfast, after school, and after supper.

More girls read outside of school.

More boys rest than girls.

More girls listen to the radio.

Almost twice as many boys as girls play out-of-doors.

More girls study than boys.

More girls take outside lessons.

About the same percentage of boys and girls belong to clubs.

Twice as many girls as boys belong to the 4-H Clubs.

Nearly twice as many boys as girls are Scouts.

Fewer boys study as they advance from the freshman to the senior year—while almost 9/10 of the girls study in each of the four classes.

Country Versus City

More boys in the country than in the city work at home before breakfast, after school, and in the evening.

Although more boys work in the country than in the city when other activities are combined with work, we find that more than twice as many city as country boys report work as their only activity.

More city than country boys and girls study in the afternoon, while a few more country than city young people study in the evening.

More boys in the country than in the city read in the evening while a few more in the city read in the afternoon than in the country.

More country than city boys play out-of-doors in the afternoon, while a few more boys in the city than in the country play out-of-doors in the evening.

More country boys and girls listen to the radio both in the afternoon and in the evening.

There are more city than country boys and girls who neither take outside lessons nor belongs to clubs.

About the same percentage of city and country children go to the movies in the afternoon, but in the evening the percentage is higher among the country high school pupils.

Slightly fewer city than country children have some form of recreation.

General

Very few high school boys and girls rest during the day—only about one out of five.

Slightly before 7:00 o'clock is the average rising time and a few minutes past 10:00 is the average retiring time. The average amount of sleep for boys is 8 hours, 45 minutes; and for girls 8 hours, 52 minutes. One out of 20 goes to bed at midnight or after.

Eight out of 10 boys and 7 out of 10 girls work during the day, either at home or away from home.

About one out of 10 goes to movies on a school night, and one out of 20 during the afternoon.

Nearly ⅔ of the high school boys and girls do not belong to clubs—and fewer belong in the city than in the country.

Over ⅘ of them do not take lessons, such as piano, dancing, etc. Only one out of 100 boys takes dancing lessons.

More children study in the evening than in the afternoon.

More than 9 out of 10 high school boys and girls have some recreation during the day.

As boys and girls grow older fewer work and slightly fewer have some form of recreation.

As boys grow older a smaller percentage study; the percentage of girls studying remains about the same.

Fewer boys belong to clubs as they grow older, whereas the percentage of girls remains constant for the first three years, decreasing in the fourth.

The Average High School Boy and Girl in the Study

The average high school boy and girl get up a few minutes before seven o'clock, do nothing but get ready for school, spend about 15 minutes at breakfast, and arrive at school about 15 minutes before school begins (the average school opening is a few minutes before 8:30 A.M.).

School is dismissed about 2:15, and they leave approximately 10 minutes later.

During the day the average boy and girl work, study and have some form of recreation but do not get any rest.

For the percentages of boys and girls taking part in the various activities at different times during the day, see questionnaires at the end of this section.

The average boy and girl go to bed shortly after 10:00 o'clock, and fall asleep in a little over 20 minutes.

There are slight differences between the activities of the average high school boy and girl—for a more detailed comparison between them see the following questionnaires:

BOYS

24 HOUR HIGH SCHOOL STUDY

Town: School begins: School ends: ....

Boy . Girl Freshman Sophomore Junior Senior ....

1. What time did you get up? *6:56 A.M. (average)*
2. Between rising time and breakfast did you
   Work at home *28%* or outside *11%*
   Play *5%*
   Study *17%*
3. How long did you spent at breakfast? *16 minutes (average)*
4. What time did you arrive at school? *16 minutes before school begins (average)*
5. What time did you leave school? *11 minutes after school is dismissed (average)*
6. Between the time school was dismissed and your evening meal, did you
   Work at home *44%* or outside *41%*
   Do home work *35%*
   Take a walk *28%*
   Play indoors *5%* or outdoors *46%*
   Read *32%*
   Movies *5%*
   Rest *18%*
   Listen to radio *40%*
   Other things *40%*
7. How long did you spend at dinner? *25 minutes (average)*
8. After dinner did you
   Work at home *26%* or outside *19%*
   Do home work *53%*
   Take a walk *30%*
   Play indoors *6%* or outdoors *35%*
   Read *33%*
   Movies *9%*
   Rest *18%*
   Listen to radio *44%*
   Other things *40%*
9. During the week do you take music, dancing or other lessons aside from school *16%*
   Belong to club group—4H—Scouts—Campfire, etc. *35%*
10. What time did you go to bed? *10:11 P.M. (average)*
11. Approximately what time did you go to sleep? *10:33 P.M. (average)*

Activities During the Day as a Whole

Work — *81%*
Study — *72%*
Recreation — *93%*
Rest — *26%*

GIRLS

24 HOUR HIGH SCHOOL STUDY

Town: .... School begins: .... School ends:

Boy .... Girl.......... Freshman .... Sophomore .... Junior Senior

1. What time did you get up? *6:58 A.M. (average)*

2. Between rising time and breakfast did you
   Work at home *31%* or outside *2%*
   Play *3%*
   Study *18%*

3. How long did you spend at breakfast? *14 minutes (average)*

4. What time did you arrive at school? *15 minutes before school begins (average)*

5. What time did you leave school? *9 minutes after school is dismissed (average)*

6. Between the time school was dismissed and your evening meal, did you
   Work at home *48%* or outside *12%*
   Do home work *59%*
   Take a walk *35%*
   Play indoors *4%* or outdoors *25%*
   Read *37%*
   Movies *4%*
   Rest *14%*
   Listen to radio *45%*
   Other things *38%*

7. How long did you spend at dinner? *27 minutes (average)*

8. After dinner did you
   Work at home *34%* or outside *6%*
   Do homework *63%*
   Take a walk *31%*
   Play indoors *4%* or outdoors *18%*
   Read *33%*
   Movies *9%*
   Rest *11%*
   Listen to radio *46%*
   Other things *42%*

9. During the week do you take music, dancing or other lessons aside from school *22%*
   Belong to club group—4H—Scouts—Campfire, etc. *34%*

10. What time did you go to bed? *10:06 P.M. (average)*

11. Approximately what time did you go to sleep? *10:30 P.M. (average)*

Activities During the Day as a Whole

Work	— *71%*
Study	— *88%*
Recreation	— *95%*
Rest	— *20%*

TWENTY-FOUR HOUR MASSACHUSETTS HIGH SCHOOL STUDY — FOOD SECTION

By Lillian R. Freedman, A.B., and Etta Bloom, A.B., *Statisticians*

Two questionnaires, on the daily activities and food habits of high school students, were distributed to the pupils in various cities and towns in Massachusetts. The first of these questionnaires, covering the activities of the students during a specified, complete school day, has already been discussed in the preceding article of this issue. The other one was on the subject of nutrition; there were questions on the type and amount of food eaten by the pupils during the twenty-four hours preceding the filling out of the questionnaire. Both questionnaires were unsigned.

The high schools used in the study were chosen to represent the city, the large town, and the small town (twenty cities and towns in all). They were divided into three population groups: Group I includes the three cities, Group II includes the seven towns of 5,000 population or over, and Group III consists of the ten towns under 5,000 population.

Almost 7,000 children answered the Daily Activities section of the questionnaire. In the Food Study, however, only 5,922 questionnaires were available, because the children (787) in one city did not send in any food sheets. Therefore, the size of Group I was reduced; Groups II and III remained the same. The number of freshmen in Groups I and II was comparatively small because some of the cities and towns in those groups have 3-year senior high schools.

Unfortunately, in many towns the food sheets were separated from the daily activities sheets; and it was in the latter only in which the sex and class of the children were given. For this reason, the information on food questions could not always be grouped by sex and class.

Of the 5,922 children who answered the food questionnaires, 1,602 (27%) specified that they were boys, and 1,880 (32%) that they were girls; 976 (16%) did not state their sex, but did give their class; and a group of 1,464 (25%) stated neither their sex nor the class to which they belonged. This last group had to be omitted from all tables except a general summary table which was not subdivided according to sex or class (Table 21). In the other tables, all totals include the group of 976 children whose sex only was not given, even though these could not be included in the subdivisions by sex.

In the Food Study, 46% of the children were boys (and 54% were girls), as compared with 47% boys in the Daily Activities Study, and 49% boys in all the high schools of the State.

Distribution of Children: Table 1

Tables 1—20 are each divided into sections A and B. Table 1 shows the number of children in each group on which figures in the succeeding tables are based.

The tables marked A analyze the data by sex and class; those marked B, by sex and population groups. The starred totals in the tables, as explained in the footnote to Table 1, are not the sums of the figures for boys and girls; they also include the group that did not state whether they were boys or girls.

TABLE 1 — DISTRIBUTION OF CHILDREN

CORRESPONDING TO TABLES 2 - 20

A — By Sex and Class

	Fresh.	*Soph.*	*Jr.*	*Sr.*	*Total*
Boys	296	589	368	349	1,602
Girls	323	728	434	395	1,880
Total*	784	1,602	1,118	954	4,458

B—By Sex and Population Groups

	Population Group I	*II*	*III*	*Total*
Boys	525	821	256	1,602
Girls	647	921	312	1,880
Total*	1,742	1,847	869	4,458

* Total includes boys, girls, and group with sex not stated but class specified.

Tables on Milk: Tables 2-5

Averages (Tables 2 and 3)

The average amount of milk each child drank was only 2.6 cups, yet every high school pupil should have at least three, or better, four cups of milk a day. The mean for boys was just 3.0 cups, but the girls drank, on the average, only 2.2 cups. The average number of milk dishes eaten was 1.1 per child.

Sex. The boys drank more milk than the girls did, but the girls ate more milk dishes. The difference in the first case, however, was much more marked than in the second, so that the boys still had a great deal more milk than the girls.

Class. The seniors had the lowest average in both drinking milk and eating milk dishes. In the case of the girls, the freshmen drank the most milk, the sophomores and juniors less, and the seniors least of all. This was true also in the number of milk dishes eaten, for both boys and girls.

Population Groups. Among the boys, Group III had the lowest average in the number of cups of milk to drink, but this group ate the largest average number of milk dishes.

TABLE 2 — AVERAGE NUMBER OF CUPS OF MILK

A — By Sex and Class

	Fresh.	*Soph.*	*Jr.*	*Sr.*	*Total*
Boys	3.1	2.9	3.2	2.7	3.0
Girls	2.5	2.3	2.3	1.9	2.2
Total*	2.8	2.7	2.7	2.4	2.6

B—By Sex and Population Groups

	Population Group I	II	III	Total
Boys	2.9	3.2	2.6	3.0
Girls	2.2	2.3	2.3	2.2
Total*	2.6	2.7	2.6	2.6

TABLE 3 — AVERAGE NUMBER OF MILK DISHES

A — By Sex and Class

	Fresh.	*Soph.*	*Jr.*	*Sr.*	*Total*
Boys	1.1	1.0	1.0	0.9	1.0
Girls	1.3	1.1	1.1	0.9	1.1
Total*	1.2	1.1	1.1	0.9	1.1

B—By Sex and Population Groups

	Population Group I	II	III	Total
Boys	0.9	1.0	1.3	1.0
Girls	1.0	1.1	1.4	1.1
Total*	1.0	1.0	1.3	1.1

Sufficient Milk (Table 4)

Less than half of the high school children had enough milk to drink (three cups or more).

Sex. There was a large difference between the percentages of boys and girls who had enough milk to drink. Many more boys than girls had at least three cups of milk; this was true in all classes and population groups. The totals show that 55% of the boys and only 39% of the girls drank three cups or more of milk.

Class. Fewer seniors had enough milk than the pupils in the other classes. The percentage of girls who drank at least three cups of milk decreased with each succeeding class, from the freshman class to the senior.

Population Groups. More children in Group II had enough milk to drink than those in the other two population groups.

TABLE 4—PER CENT OF CHILDREN DRINKING SPECIFIED NUMBER OF CUPS OF MILK

	A — By Sex and Class					*B—By Sex and Population Groups*			
						Population Group			
	Fresh.	*Soph.*	*Jr.*	*Sr.*	*Total*	I	II	III	Total
					None				
Boys	13%	10%	11%	15%	12%	12%	11%	17%	12%
Girls	15%	16%	19%	23%	18%	18%	17%	20%	18%
					Some, but Less than Three Cups				
Boys	31%	35%	30%	34%	33%	32%	32%	34%	33%
Girls	39%	44%	43%	46%	43%	46%	41%	43%	43%
					Three Cups or More				
Boys	56%	55%	59%	51%	55%	56%	57%	49%	55%
Girls	46%	40%	38%	31%	39%	36%	42%	37%	39%

No Milk (Tables 4 and 5)

On the day of the questionnaire, one-seventh of the children drank no milk at all, and almost two-fifths ate no milk dishes.

Sex. More girls than boys did not drink any milk, and the difference is quite marked; however, more boys than girls did not eat any milk dishes.

Class. The percentage of children who ate no milk dishes increased progressively from the freshman class to the senior, for boys and girls both; also, the percentage of girls who drank no milk increased each year, until by the senior year, almost one-fourth of the girls had no milk to drink on the day studied.

Population Groups. The small towns had the largest percentage of children, both boys and girls, who did not drink any milk; but, on the other hand, the small towns had the smallest percentage who did not eat any milk dishes.

Table 5—PER CENT OF CHILDREN HAVING NO MILK DISHES

	A — By Sex and Class					*B—By Sex and Population Groups*			
						Population Group			
	Fresh.	*Soph.*	*Jr.*	*Sr.*	*Total*	I	II	III	Total
Boys	39%	39%	42%	46%	41%	47%	42%	29%	41%
Girls	32%	33%	35%	42%	35%	39%	35%	26%	35%

Tables on Vegetables: Tables 6-9

Averages (Tables 6 and 7)

More cooked vegetables were eaten than salad or raw vegetables; 1.5 servings of cooked vegetables, and 0.9 servings of salad or raw vegetables. However, since most people have potato every day, this indicates that not many cooked vegetables other than potatoes were eaten.

Sex. The boys ate slightly more cooked vegetables than the girls did, but the girls tended to eat a little more salad or raw vegetables than the boys.

Class. The average number of vegetables eaten, both cooked and salad or raw, remained pretty constant in all the classes.

Population Groups. There was a definite increase in the number of servings of cooked vegetables eaten from Population Group I to Population Group III. On the other hand, the number of servings of salad or raw vegetables eaten decreased slightly from Group I to Group III.

Table 6—AVERAGE NUMBER OF SERVINGS OF COOKED VEGETABLES

	A — By Sex and Class					*B—By Sex and Population Groups*			
						Population Group			
	Fresh.	*Soph.*	*Jr.*	*Sr.*	*Total*	I	II	III	Total
Boys	1.7	1.5	1.6	1.5	1.6	1.3	1.6	1.9	1.6
Girls	1.5	1.5	1.6	1.5	1.5	1.4	1.5	1.8	1.5
Total*	1.6	1.5	1.6	1.5	1.5	1.3	1.6	1.9	1.5

Table 7—AVERAGE NUMBER OF SERVINGS OF SALAD OR RAW VEGETABLES

	A — By Sex and Class					*B—By Sex and Population Groups*			
						Population Group			
	Fresh.	*Soph.*	*Jr.*	*Sr.*	*Total*	I	II	III	Total
Boys	0.9	0.9	0.8	0.9	0.9	0.9	0.9	0.7	0.9
Girls	1.0	0.9	1.0	0.9	0.9	1.0	1.0	0.7	0.9
Total*	1.0	0.9	1.0	0.9	0.9	1.0	0.9	0.8	0.9

No Vegetables (Tables 8 and 9)

More than one-third of the children had no salad or raw vegetables; somewhat less than half that number had no cooked vegetables.

Sex. A substantially greater percentage of boys than girls did not eat any salad or raw vegetables; a slightly greater percentage of boys than girls did not eat any cooked vegetables.

Class. There was not much regular variation among the classes in the percentage of children who ate no cooked vegetables, but the senior class had the largest percentage who ate no salad or raw vegetables.

Population Groups. The percentage of children who did not eat any cooked vegetables decreased from the cities to the small towns, with the cities appreciably the highest. The percentage of children who ate no salad or raw vegetables increased from the cities to the small towns; the figures for the latter showed that as many as 50% of the children had none on that particular day.

TABLE 8—PER CENT OF CHILDREN EATING NO COOKED VEGETABLES

	A — By Sex and Class					*B—By Sex and Population Groups*			
						Population Group			
	Fresh.	*Soph.*	*Jr.*	*Sr.*	*Total*	I	II	III	Total
Boys	16%	17%	16%	18%	17%	22%	14%	14%	17%
Girls	15%	17%	15%	17%	16%	21%	14%	13%	16%

TABLE 9—PER CENT OF CHILDREN HAVING NO SALAD OR RAW VEGETABLES

	A — By Sex and Class					*B—By Sex and Population Groups*			
						Population Group			
	Fresh.	*Soph.*	*Jr.*	*Sr.*	*Total*	I	II	III	Total
Boys	38%	38%	43%	44%	41%	38%	39%	50%	41%
Girls	35%	33%	33%	36%	34%	29%	33%	49%	34%

Tables on Fruit: Tables 10-13

Averages (Tables 10 and 11)

These high school children ate more citrus fruit (including tomatoes) than other types of fruit: 1.3 servings of the former compared with 1.0 servings of the latter.

Sex. The girls ate slightly more citrus fruit than the boys did, but in the case of noncitrus fruit, the average was about the same for boys and girls.

Class. In general, the senior class had the lowest average in the number of servings of fruit eaten, both citrus and noncitrus.

Population Groups. Group III had the lowest average of citrus fruit eaten; Groups I and II were about equal. The average number of servings of noncitrus fruit showed practically no variation among the different population groups.

TABLE 10—AVERAGE NUMBER OF SERVINGS OF CITRUS FRUIT

	A — By Sex and Class					*B—By Sex and Population Groups*			
						Population Group			
	Fresh.	*Soph.*	*Jr.*	*Sr.*	*Total*	I	II	III	Total
Boys	1.3	1.2	1.3	1.0	1.2	1.3	1.3	1.0	1.2
Girls	1.4	1.3	1.4	1.2	1.3	1.3	1.4	1.2	1.3
Total*	1.4	1.3	1.4	1.1	1.3	1.3	1.3	1.2	1.3

TABLE 11—AVERAGE NUMBER OF SERVINGS OF NONCITRUS FRUIT

	A — By Sex and Class					*B—By Sex and Population Groups*			
						Population Group			
	Fresh.	*Soph.*	*Jr.*	*Sr.*	*Total*	I	II	III	Total
Boys	1.1	1.1	0.9	0.8	1.0	1.0	1.0	0.9	1.0
Girls	1.0	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Total*	1.0	1.1	1.0	0.9	1.0	1.0	1.0	1.0	1.0

No Fruit (Tables 12 and 13)

About one-fifth of the children did not eat any citrus fruit (including tomatoes), and as many as one-third did not have any noncitrus fruit.

Sex. The percentage of children who ate no citrus fruit was higher for boys than for girls; this was true also of noncitrus fruit.

Class. The senior class had the largest percentage of children who ate no citrus fruit.

Population Groups. The small towns had a greater percentage of children who did not eat any citrus fruit than either of the other population groups; Group III also had the highest percentage who did not eat any noncitrus fruit.

TABLE 12—PER CENT OF CHILDREN HAVING NO CITRUS FRUIT

	A — By Sex and Class					*B—By Sex and Population Groups*			
						Population Group			
	Fresh.	*Soph.*	*Jr.*	*Sr.*	*Total*	I	II	III	Total
Boys	27%	23%	23%	32%	26%	24%	24%	35%	26%
Girls	19%	20%	19%	22%	20%	20%	17%	30%	20%

TABLE 13— PER CENT OF CHILDREN HAVING NO NONCITRUS FRUIT

	A — By Sex and Class					*B—By Sex and Population Groups*			
						Population Group			
	Fresh.	*Soph.*	*Jr.*	*Sr.*	*Total*	I	II	III	Total
Boys	37%	30%	39%	44%	37%	34%	36%	42%	37%
Girls	37%	29%	36%	34%	33%	32%	31%	40%	33%

Tables on Eggs: Tables 14-15

Averages (Table 14)

On the average, each child had 1.5 eggs (including egg dishes).

Sex. In all classes and population groups, the boys ate more eggs than the girls did.

Class. The average number of eggs eaten was highest for the freshmen, and lowest for the seniors.

Population Groups. Population Group II had the highest average in the number of eggs eaten.

TABLE 14—AVERAGE NUMBER OF EGGS

	A — By Sex and Class					*B—By Sex and Population Groups*			
						Population Group			
	Fresh.	*Soph.*	*Jr.*	*Sr.*	*Total*	I	II	III	Total
Boys.	1.8	1.6	1.6	1.5	1.6	1.4	1.8	1.3	1.6
Girls	1.6	1.3	1.3	1.2	1.3	1.3	1.4	1.2	1.3
Total*	1.7	1.4	1.5	1.3	1.5	1.3	1.6	1.4	1.5

No Eggs (Table 15)

More than one-fourth of the children ate no eggs (including egg dishes).

Sex. In general, more girls than boys did not eat any eggs.

Class. The percentage of children who ate no eggs increased from the freshman to the senior class.

Population Groups. Group III (the small towns) had the highest percentage of children who did not eat any eggs, and Group II the lowest.

TABLE 15—PER CENT OF CHILDREN EATING NO EGGS

	A — By Sex and Class					*B—By Sex and Population Groups*			
						Population Group			
	Fresh.	*Soph.*	*Jr.*	*Sr.*	*Total*	I	II	III	Total
Boys	24%	26%	28%	32%	27%	31%	23%	33%	27%
Girls	23%	28%	29%	33%	29%	28%	27%	33%	29%

Tables on Meat: Tables 16-17

Averages (Table 16)

Each child had an average of 1.4 servings of meat.

Sex. The boys ate more meat than the girls, in every group.

Class. There was no variation found among the classes in the number of servings of meat eaten.

Population Groups. On the whole, the number of servings of meat eaten by the boys increased from Population Group I to Population Group III. In the case of the girls, the average was constant in the different population groups.

TABLE 16—AVERAGE NUMBER OF SERVINGS OF MEAT

A — By Sex and Class

	Fresh.	*Soph.*	*Jr.*	*Sr.*	*Total*
Boys	1.5	1.5	1.5	1.5	1.5
Girls	1.3	1.3	1.3	1.3	1.3
Total*	1.4	1.4	1.5	1.4	1.4

B—By Sex and Population Groups

	Population Group I	II	III	Total
Boys	1.4	1.6	1.6	1.5
Girls	1.3	1.3	1.3	1.3
Total*	1.4	1.4	1.6	1.4

No Meat (Table 17)

Only one-tenth of the children did not eat any meat.

Sex. Although the boys ate more meat than the girls, we found that on the whole the percentage of children who did not eat any meat was approximately the same for both boys and girls.

Class. There was no regular variation found among the classes in the percentage of children who ate no meat.

Population Groups. The percentage of children who did not eat any meat was somewhat larger, for the boys, in Group III than in the other groups; and for the girls, the difference between Group III and the other groups was much greater.

TABLE 17—PER CENT OF CHILDREN EATING NO MEAT

A — By Sex and Class

	Fresh.	*Soph.*	*Jr.*	*Sr.*	*Total*
Boys	10%	11%	8%	9%	10%
Girls	9%	11%	11%	10%	10%

B—By Sex and Population Groups

	Population Group I	II	III	Total
Boys	10%	10%	11%	10%
Girls	10%	9%	16%	10%

Table on Whole Grains: Table 18

Three-quarters of the children ate dark whole grain bread, muffins, or cereals on the day of the questionnaire.

Sex. More boys than girls ate whole grains in each class and population group.

Class. In the case of the boys, the freshman class had the largest percentage of children who ate whole grains. For girls, the freshmen also had the highest percentage, and there was a continuous decrease to the senior class.

Population Groups. Group I had the lowest percentage of children who ate whole grains; Groups II and III, which were about equal, had a considerably larger percentage who ate whole grains.

TABLE 18—PER CENT OF CHILDREN WHO EAT WHOLE GRAIN BREAD, MUFFINS, OR CEREALS

	A — By Sex and Class					*B—By Sex and Population Groups*			
						Population Group			
	Fresh.	*Soph.*	*Jr.*	*Sr.*	*Total*	I	II	III	Total
Boys	83%	75%	75%	79%	77%	69%	81%	83%	77%
Girls	81%	74%	70%	68%	73%	68%	76%	75%	73%

Tables on Sweets: Tables 19-20

None of the Specified Sweets (Table 19)

A little less than one-tenth of the children ate none of the four specified sweets: candy, sundaes, cakes, and pies.

Sex. Comparing total boys with total girls, and also boys and girls in the four classes, we find little difference between the sexes in the percentage who did not eat any of the four sweets.

Class. The seniors had a larger percentage of children who ate none of the four sweets than any other class.

Population Groups. The small towns had proportionately the most children who did not eat any of the four specified sweets.

TABLE 19—PER CENT OF CHILDREN EATING THE SPECIFIED SWEETS

	A — By Sex and Class					*B—By Sex and Population Groups*			
						Population Group			
	Fresh.	*Soph.*	*Jr.*	*Sr.*	*Total*	I	II	III	Total
					None of the Specified Sweets				
Boys	8%	9%	8%	11%	9%	11%	7%	11%	9%
Girls	9%	8%	9%	10%	9%	7%	7%	17%	9%
					Candy				
Boys	60%	51%	51%	37%	50%	45%	51%	54%	50%
Girls	59%	58%	51%	44%	53%	56%	52%	51%	53%
					Sundaes				
Boys	15%	19%	17%	24%	19%	22%	19%	13%	19%
Girls	13%	19%	16%	23%	18%	21%	18%	10%	18%
					Cakes				
Boys	71%	69%	67%	66%	68%	63%	71%	69%	68%
Girls	72%	68%	72%	66%	69%	65%	72%	69%	69%
					Pies				
Boys	46%	41%	43%	34%	41%	38%	44%	36%	41%
Girls	31%	29%	23%	22%	27%	25%	28%	25%	27%

Specified Sweets: Candy, Sundaes, Cakes, Pies (Table 19)

The order of popularity of the four sweets, for both boys and girls, was cakes, candy, pies, and sundaes. About two-thirds of the children ate cakes, one-half ate candy, one-third had pies, and one-fifth had sundaes.

Sex. The only great difference between boys and girls in eating sweets was found in pies; in each class and population group many more boys than girls ate pies. Also a somewhat higher percentage of boys than girls had sundaes; however, a slightly larger percentage of girls ate candy and cakes than boys did.

Class. For candy and pies, and to a lesser extent, cakes, there was found a downward tendency from the freshman to the senior class, but in the case of sundaes, there was an increase from freshmen to seniors.

Population Groups. The percentage of boys who ate candy increased from Group I to Group III, but the percentage of girls who ate candy decreased from Group I to Group III. Group II had the largest percentage of children who ate cakes, and also the highest percentage who ate pies. The percentage of children who ate sundaes decreased from Population Group I to Population Group III, the decrease being most marked in the small towns.

Combinations of Sweets (Table 20)

Almost three-fourths of the children had one or two of the specified sweets, one-fifth had three or more of these sweets, and less than one-tenth had none at all.

Sex. More girls than boys ate only one of the sweets studied; there was practically no difference between boys and girls in the percentage who ate two types of sweets; and for three or more types of sweets, the percentage for boys was somewhat greater than for girls.

Class. In the case of no sweets, or any one sweet, there was an upward tendency from the freshman to the senior class; for two or more types of sweets, the tendency in general was downward.

Population Groups. There was a decrease from Population Group I to Population Group III in the percentage of children who ate any one of the specified sweets. Group II had the highest percentage who ate any two types of sweets. For three types of sweets, there was a slight increase from Group I to Group III. In the case of all four sweets, Population Group II, among the boys, had the highest percentage.

TABLE 20—PER CENT OF CHILDREN EATING VARIOUS COMBINATIONS OF THE SPECIFIED SWEETS

	A — By Sex and Class					*B—By Sex and Population Groups*			
						Population Group			
	Fresh.	*Soph.*	*Jr.*	*Sr.*	*Total*	I	II	III	Total
				None of the 4 Specified Sweets					
Boys	8%	9%	8%	11%	9%	11%	7%	11%	9%
Girls	9%	8%	9%	10%	9%	7%	7%	17%	9%
				Any 1 of the 4 Specified Sweets					
Boys	26%	30%	36%	39%	33%	34%	32%	32%	33%
Girls	31%	35%	41%	40%	37%	40%	37%	31%	37%
				Any 2 of the 4 Specified Sweets					
Boys	41%	40%	33%	33%	37%	36%	38%	35%	37%
Girls	41%	38%	32%	37%	37%	36%	39%	34%	37%
				Any 3 of the 4 Specified Sweets					
Boys	15%	15%	16%	13%	14%	14%	15%	16%	14%
Girls	15%	14%	14%	10%	13%	13%	13%	15%	13%
				All 4 of the Specified Sweets					
Boys	10%	6%	7%	4%	7%	5%	8%	6%	7%
Girls	4%	5%	4%	3%	4%	4%	4%	3%	4%

General Summary

Totals (Table 21)

The average high school student had, on a particular day, approximately 2½ cups of milk, 1 milk dish, 1½ servings of cooked vegetables, 1 serving of salad or raw vegetables, 1¼ servings of citrus fruit (including tomatoes), 1 serving of noncitrus fruit, 1½ eggs (including egg dishes), and 1½ servings of meat.

Approximately ⅔ of the children ate cake, ½ ate candy, ⅓ ate pie, and ⅕ ate sundaes. About ¾ of the children had one or two of the specified sweets, and ⅕ had three or all four of the specified sweets.

Approximately one out of three children did not eat any salad or raw vegetables, and about the same number did not eat any noncitrus fruit; one out of four children did not eat any eggs (including egg dishes), and also one out of four had no whole grain bread, muffins, or cereals; one out of five children did not eat any citrus fruit (including tomatoes); one out of six ate no cooked vegetables; one out of seven drank no milk; one out of ten did not eat any meat; and one out of twelve ate no sweets.

TABLE 21—AVERAGES AND PERCENTAGES ON FOOD QUESTIONS FOR TOTAL CHILDREN[1]

Milk

Average number of cups of milk	2.6
Per cent of children drinking specified number of cups of milk	
None	14%
Some, but less than three cups	39%
Three cups or more	47%
Average number of milk dishes	1.1
Per cent of children having no milk dishes	38%

Vegetables

Average number of servings of cooked vegetables	1.5
Per cent of children eating no cooked vegetables	16%
Average number of servings of salad or raw vegetables	0.9
Per cent of children having no salad or raw vegetables	37%

Fruit

Average number of servings of citrus fruit (including tomatoes)	1.3
Per cent of children having no citrus fruit (including tomatoes)	22%
Average number of servings of noncitrus fruit	1.0
Per cent of children having no noncitrus fruit	34%

Eggs

Average number of eggs (including egg dishes)	1.5
Per cent of children eating no eggs	27%

Meat

Average number of servings of meat	1.4
Per cent of children eating no meat	10%

Whole Grains

Per cent of children who eat whole grain bread, muffins, or cereals	75%

Sweets

Per cent of children eating the specified sweets	
None of the specified sweets	8%
Candy	53%
Sundaes	20%
Cakes	69%
Pies	32%

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[1] Including all groups not stated as to sex or class.

Table 21 (Continued)

Per cent of children eating various combinations of the specified sweets

None of the specified sweets	8%
Any one of the four specified sweets	34%
Any two of the four specified sweets	38%
Any three of the four specified sweets	14%
All four of the specified sweets	6%

Sex

The average boy drank more milk than the average girl, ate more eggs and meat, and slightly more cooked vegetables; however, he ate slightly less citrus fruit than the average girl. In the case of noncitrus fruit, and of salad or raw vegetables, there was no appreciable difference between the sexes. When it comes to sweets, we find that very many more boys than girls ate pie, and a few more boys than girls ate sundaes; but slightly more girls than boys ate candy and cake. More girls than boys ate only one type of the specified sweets; about the same number of boys and girls ate any two types; but more boys than girls ate three or all four types of sweets.

There were more boys than girls who did not eat any milk dishes, and this was true also for vegetables and fruit; on the other hand, more girls than boys did not drink any milk, nor eat any eggs, nor any whole grain bread, muffins, or cereals. The percentage of children who ate no meat, and the percentage who ate no sweets, was about the same for boys and girls.

Since we found that for most foods, boys had a higher average than girls, yet in many cases more boys than girls did not eat these foods, it can be concluded that the boys who did eat them ate even more of them, compared to the girls, than the differences in averages between boys and girls would seem to indicate.

Class

In the case of the averages for vegetables and meat, there was not much variation among the classes. For milk and eggs, there was a downward tendency from the freshman to the senior class, with the seniors having the lowest averages. The senior class was also the one eating the least fruit.

The freshman class had the highest percentage of children who ate whole grain bread, muffins, or cereals.

The only sweets which showed an upward tendency from the freshman to the senior class were sundaes; candy, cakes, and pies all showed a downward tendency.

The percentage of children who ate any one type of sweet tended to increase in each succeeding class; for children eating any two, three, or four types of sweets, the tendency from the freshman to the senior class was downward.

Population Groups

The small towns had the largest percentage of children who drank no milk; also, the highest percentage who ate no salad or raw vegetables; and this was true, too, for fruit, eggs, and meat. Only in the case of children who ate no milk dishes, or those who ate no cooked vegetables, did the small towns have the lowest percentage; in both these cases, as well as for children eating no whole grains, the highest percentage was found in the cities. A point in favor of the small towns is the fact that the highest percentage of children who ate none of the four specified sweets was found in this population group.

News Note

"So Long Boys," a new leaflet about syphilis and gonorrhea, designed for the information of young men about to enter the Army and Navy, has been released by the American Social Hygiene Association.

Written by Dr. Walter Clarke, executive director of the American Social Hygiene Association, this leaflet will give the boy about to join up the essential facts about syphilis and gonorrhea and the prevention of these diseases.

Publication and free distribution of "So Long Boys" is one of a number of projects planned by the Association, in cooperation with the Army, Navy, Public Health Service and other government and voluntary agencies, as part of the national defense program to protect military and industrial personnel from the health and morale destroying diseases—syphilis and gonorrhea. Fifth National Social Hygiene Day, February 5, emphasizes the need of reducing commercialized prostitution to a minimum and of keeping venereal disease infection rates as low as possible in army, navy, and defense industrial personnel.

Social hygiene societies, health departments, church and civic groups are urged to see that every young man has a copy of "So Long Boys" before he leaves home. Additional copies may be secured, without charge, from the American Social Hygiene Association, 1790 Broadway, New York, N. Y.

Book Notes

THE FUNDAMENTALS OF PERSONAL HYGIENE, by Walter W. Kruger, Ph.B. $1.75. Philadelphia. Saunders, 1940. 304 pp.

In the small volume on "Personal Hygiene" the author has succeeded in accomplishing his aims as follows:

1. By selecting only those phases of the subject that are vital to the well-being of the individual;

2. Presenting each phase in a practical manner so that it may become functional in the life of the student;

3. Emphasizing the importance of health practices and habits in every-day life;

4. Encouraging correct attitudes, desires and ideals.

As a whole, the book presents a simplified presentation of personal hygiene and should serve very acceptably as a handbook to accompany lectures and class discussions.

The weakest chapter is that on "Hygiene Aspects of Sex." The subject is a difficult one to handle even in a textbook whose size permits more extensive developing. Too much space is taken here where space is limited in giving detailed treatment which may change before there is another edition of the book.

There is a well-selected bibliography and a set of questions for class discussion at the end of each chapter.

The Public Health Nurse and Her Patient, by Ruth Gilbert, R.N. $2.25
380 pp. New York. The Commonwealth Fund. 1940.

Because of her activities in the field of mental hygiene, Miss Gilbert is especially qualified to write on the subject "The Public Health Nurse and Her Patient." The book brings out forcibly what the nurse's attitude should be toward bedside nursing. The patient's attitude regarding his problem is very ably explained by Miss Gilbert. It is a book that will be helpful to any public health nurse, because it is simply expressed and comprehensive.

REPORT OF DIVISION OF FOOD AND DRUGS

(As required by General Laws, Chapter 111, Section 25.)

During the months of March, April, May, June, July and August, 1940, samples were collected in 523 cities and towns.

There were 2,869 samples of milk examined, of which 314 were below standard, from 14 samples the cream had been in part removed, and 40 samples contained added water. There were 3,813 bacteriological examinations made of milk, 2,942 of which complied with the requirements. There were 148 bacteriological examinations made of goat milk, all of which complied with the requirements. There were 3 bacteriological examinations made of soft drinks, 5 of chocolate and coffee drinks, 2 of coffee milk, 1 of candy, and 1 of a Dari-Mix sample, all of which complied with the requirements. There were 180 bacteriological examinations made of cream, 63 of which did not comply with the requirements; 99 bacteriological examinations of ice cream, 11 of which did not comply with the requirements; 7 bacteriological examinations of crab meat from the hands of pickers, 2 of which did not comply with the requirements; 2 bacteriological examinations of empty bottles, 1 of which did not comply with the requirements; 9 bacteriological examinations of cans alleged to be sterile, 7 of which did not comply with the requirements; and 44 bacteriological examinations of mattress fillings, 9 of which did not comply with the requirements.

There were 1,017 samples of food examined, 233 of which were adulterated. These consisted of 6 samples of cream, 4 of which were low in fat for the grade specified, 1 sample showed a brown deposit in the bottom of bottle, and 1 sample was not properly pasteurized; 6 samples of butter, 5 of which were below the legal standard in milk fat, and 1 sample was moldy; 4 samples of cream cheese all of which contained excess water; 2 samples of oysters and 11 samples of clams, all of which contained added water; 1 sample of frozen egg yolks, 1 sample of fish, 3 samples of pork scraps, 1 sample of pork chops, 3 samples of lamb patties, 1 sample of turkey, 1 sample of sandwich loaf, 2 samples of chickens, and 1 sample of veal ribs, all of which were decomposed; 2 samples of bacon which were rancid; 6 samples of bologna which contained cereal or vegetable flour in excess of 2 per cent; 14 samples of soft drinks, 11 of which contained benzoic acid not so labeled, 2 samples contained dirt in bottles, and 1 sample bore no label or cap marking; 10 samples of wash water which were deficient in caustic alkali; 10 samples of vinegar, 8 of which were adulterated, and 2 contained less than 4.00% acetic acid; 2 samples of pickles which contained benzoic acid not so labeled; 3 samples of maple syrup, all of which contained cane sugar; 5 samples of olive oil, 4 of which contained cottonseed oil, and 1 sample contained corn oil; 79 samples of sausage, 58 of which were decomposed and 1 sample also contained a compound of sulphur dioxide not so labeled, 17 samples contained an excess of 2 per cent cereal and vegetable flour, and 4 samples contained a compound of sulphur dioxide not so labeled; 29 samples of hamburg steak, 17 of which were decomposed, 8 contained a compound of sulphur dioxide not so labeled and 1 sample was also decomposed, and 4 samples contained sodium sulphite in excess of one tenth of one per cent and 2 samples were also decomposed; and 30 samples of bedding and upholstering materials, 15 of which were samples of feathers and down which did not contain the materials as specified, and 15 samples of plant and animal fibers which did not contain the materials as specified.

There were 60 samples of drugs examined, of which 12 were adulterated. These consisted of 1 sample of sweet oil which contained cottonseed oil, 7 samples of carbolic acid solution deficient in phenol, 1 sample of spirit of nitrous ether, and 3 samples of citrate of magnesia, all of which did not conform to the requirements of the U. S. Pharmacopeia.

The police departments submitted 202 samples of liquor for examination. The police departments also submitted 21 samples to be analyzed for poison or drugs, consisting of 10 samples of white powder, 5 of which contained heroin, 3 contained morphine or derivatives thereof, and 2 were examined for narcotics with negative results; 5 samples of cigarettes, 2 of which contained cannabis, and 3 were examined for poisons with negative results; 1 sample of seeds which was found to be hemp seeds; 1 sample of gum which was gum opium; 1 sample of liquid was found to contain ergot; 1 sample of herbs which was examined for narcotics with negative results; and 2 samples—1 a sample of white pills and the other a capsule—were examined for poisons with negative results. The Department of Fisheries and Game submitted five samples of dried corn for examination. Three of these samples, grain taken from pigeon crop, were found to contain strychnine, the other two samples of dried corn were examined for cyanide, arsenic, and strychnine, with negative results.

There were inspected 826 plants operated for the pasteurization of milk; 263 restaurants; 256 soft drink plants; 915 bakeries; 3 sausage plants; 12 dairies; 1 candy factory; 112 ice cream establishments, 4 out of State; and 544 mattress establishments.

There were 230 hearings held pertaining to violations of the laws.

There were 139 convictions pertaining to violations of the laws, $3,275 in fines being imposed.

Joseph Koziol of Warren; Anthony Staniunas of Marlboro; Francis Davis of North Adams; and Armand Brodeur of Woonsocket, Rhode Island, were convicted for violations of the milk laws.

Manuel Cabaceiras of Fall River; Henry Kubli of Pittsfield; Edward Kelleher, 2 cases, of Newburyport; Samuel Pike, Jr., of Wilmington; Arthur Miller of Methuen; J. A. Jalbert, 3 cases, of Southbridge; Fred Hemenway of Williamsburg; Michael Vaidulas of Hubbardston; and C. H. Reynolds of Ludlow, were convicted for violations of the pasteurization laws and regulations. Manuel Cabaceiras of Fall River appealed his case.

First National Stores, Incorporated, of Salisbury; First National Stores, Incorporated, 3 cases, Isadore J. Miller and Joseph Yarchin of New Bedford; Stanley Slonka of Ludlow; The Great Atlantic & Pacific Tea Company, and Ted Posovsky of Orange; A. H. Phillips, Incorporated, of Belchertown; The Oscar Spitzler Company, Incorporated, and Growers Outlet, Incorporated, of Holyoke; Alexander Perdikis of Webster; Charles Selvecki of Northampton;

Malcolm Neal, George Vinick, and Del Vecchio & Arpaio, Incorporated, of Springfield; John J. Wohrle and Henry Frenier of Pittsfield; George Beopple Company, Incorporated, and Brockelman Brothers, Incorporated, 3 cases, of Worcester; Cavigioli Packing Company, Incorporated, of Milford; Omaha Packing Company, Incorporated, 3 cases, of Lowell; Joseph Cohen and Louis Streisfield of Amesbury; James Anderson, 5 cases, Francis Courtney, 7 cases, and Milton Goldberg, 7 cases, of Beverly; Mary V. Grady of Salem; Harry Richstein of Quincy; Joseph Snyder, 2 cases, and Fall River Public Market, Incorporated, 3 cases, of Fall River; Taunton Public Market, Incorporated, 2 cases, of Taunton; C. F. Anderson, Incorporated, 2 cases, Christy Mihos, and Alice H. Weiner, 2 counts, of Brockton; Sulkin Spice Company, 5 cases, Colonial Provision Company, 2 counts, and South Cash Market, Incorporated, of Boston; Joseph Freedman, Mrs. Goldie Paul, 2 cases, and Harry Rabinovitz of Roxbury; Brockelman Brothers, Incorporated, of Framingham; Conestoga Cream & Cheese Manufacturing Corporation, 2 cases, of New York City; and Lyndonville Creamery Association of Lyndonville, Vermont, were all convicted for violations of the food laws. South Cash Market, Incorporated, of Boston; and Isadore J. Miller of New Bedford, appealed their cases. Two cases of the seven entered against Francis Courtney, and two cases of the seven entered against Milton Goldberg, both of Beverly, were entered on samples collected by a Federal Inspector.

Howard S. Rust, 2 cases, of Falmouth; and Pilgrim Restaurant, Incorporated, 2 cases, of Hyannis, were convicted for violations of the sanitary food law.

Donald T. Girouard of Winchendon; and Commander Beverage Company, Incorporated, of South Sudbury; were convicted for violations of the soft drink laws and regulations.

Boston Baking Company, Incorporated, of Roxbury; Frank Evanski and William M. Calder of Webster; Myer Rosenberg, 3 cases, of Holyoke; Mary Kilkus of Brockton; Louis Schwartz of Lawrence, 2 cases; and Bertha Weintraub of Malden, were all convicted for violations of the bakery laws and regulations. Louis Schwartz of Lawrence appealed his two cases.

David Poust and Summit Pharmacy of Brookline; Sexton Drug Company, Incorporated, of Springfield; and James M. Hughes of Pittsfield, were convicted for violations of the drug laws.

C. F. Hovey Company and Morgan's Incorporated, of Boston; South End Bed Spring Company, Incorporated, of South Boston; Philip J. Byer of Brookline; Sadie Aronson and Lillian R. Goldstein of Dorchester; Comfort Pillow & Feather Company of Somerville; Harold Glickman of Newton; Adam Waitt of Brockton; Rudd Furniture Company, Incorporated, of Haverhill; George L. Girshman, The Hadley Company, The Kane Company, 2 cases, and Jacob Sobel, of Worcester; Henry Lahikainen of Gardner; Montgomery Ward & Company, Incorporated, of Greenfield; David D. Miller, Metropolitan Furniture Company, and The Hadley Company, of Springfield; James Takas and John Brenner of New Haven, Connecticut; and Reuben H. Cohen of Manchester, New Hampshire, were all convicted for violations of the mattress laws. The Kane Company, 1 case, of Worcester; Harold Glickman of Newton; Morgan's Incorporated, of Boston; and Adam Waitt of Brockton, appealed their cases.

Andrew Zygmuntowicz of Uxbridge; and Umberto Sfreddo of Southbridge, were convicted for violations of the slaughtering laws.

Morris Cohen of New Bedford was convicted for obstructing a slaughtering inspector.

Umberto Morretti of Taunton was convicted for obstructing a State Inspector.

In accordance with Section 25, Chapter 111 of the General Laws, the following is the list of articles of adulterated food collected in original packages from manufacturers, wholesalers, or producers:

Butter which was below the standard of 80% milk fat was obtained as follows:

Two samples from the firm of Anderson, Goldberg & Courtney of Beverly; and 1 sample from the National Creamery Company of Boston.

One sample of butter which was decomposed was obtained from Health Bread Bakery, Incorporated, of Chicopee.

Three samples of cream which were low in fat for the grade specified were obtained from Gage Roberts of Beverly.

One sample of light cream which was not properly pasteurized was obtained from Manuel Furtado of Fall River.

Cream cheese not conforming to the legal standard was obtained as follows:

Three samples from Lyndonville Creamery Association of Lyndonville, Vermont; and 1 sample from Conestoga Cream & Cheese Manufacturing Corporation of New York.

Clams which contained added water were obtained as follows: Two samples from Ipswich Shellfish Company of Ipswich; one sample each, from S. Smart and I. W. Stavis of Chelsea; First National Stores, Incorporated, of Brookline; and The Great Atlantic & Pacific Tea Company of Quincy.

One sample of maple syrup which contained cane sugar was obtained from Charles B. Christie of Williamstown.

Olive oil which contained cottonseed oil was obtained as follows:

One sample each, from Domenico Previte of Spagna Oil Company of Boston; V. Buonocore, Incorporated, of New York; and F. A. Pouchot of Springfield.

One sample of olive oil which contained corn oil was obtained from Pulcella Olive Oil Company of New York.

One sample of sweet relish which contained sodium benzoate not so labeled was obtained from First National Stores, Incorporated, of Taunton.

Soft drinks which contained benzoic acid not so labeled were obtained as follows:

Three samples from General Beverage Corporation of Springfield; 2 samples from P. Cray Company of Holyoke; and 1 sample each, from Crystal Soda Company of Holyoke; John Krol of Ware; National Bottling Works of Southbridge; Hampden Bottling Company of Northampton; Tip-Top Beverage Company, Incorporated, of Springfield; and Athol Bottling Company of Athol.

One sample of soft drink which bore no label or cap marking was obtained from Donald T. Girouard of Winchendon.

Eight samples of vinegar which were adulterated were obtained from Sulkin Spice Company of Boston.

One sample of vinegar which was low in acidity was obtained from Standard Product Company of New Britain, Connecticut.

Hamburg steak which was decomposed was obtained as follows: One sample each, from Powow River Meat Market, Incorporated, Joseph Cohen, Anthony Vine, and Louis Streisfield, of Amesbury; South End Cash Market, Incorporated, of Boston; Jacob Segal, Harry Rabinovitz, and Oscar Berg, of Roxbury; Granitone Market, Incorporated, of Quincy; Harold Gilligan, and C. F. Anderson, of Brockton; Fall River Public Market, Incorporated, of Fall River; Umberto Morretti and Taunton Public Market of Taunton; Jack Miller of New Bedford; Alters Market of Gardner; and First National Stores, Incorporated, of Greenfield.

Hamburg steak which contained a compound of sulphur dioxide not so labeled was obtained as follows:

One sample each, from Union Foodland, Incorporated, of New Bedford; Robert Morris, and Jennie Alpert, of Roxbury; Benjamin Schwartz of Dorchester; Harry Rosenberg of Boston; Atlas Food Mart, Incorporated, of Quincy; and First National Stores, Incorporated, of Salisbury Beach.

One sample of hamburg steak which contained a compound of sulphur dioxide not so labeled and was also decomposed was obtained from Joseph Friedman and Jacob Segall of Roxbury.

Hamburg steak which contained sodium sulphite in excess of one tenth of one per cent was obtained as follows:

One sample each, from Subway Delicatessen, Incorporated, of Boston; and Max Jacobson of Holyoke.

Two samples of hamburg steak which contained sodium sulphite in excess of one tenth of one per cent and were also decomposed were obtained from Mrs. Goldie Paul of Roxbury.

Sausage which was decomposed was obtained as follows: Two samples each, from C. F. Anderson of Brockton; Joseph Snyder of Fall River; First National Stores, Incorporated, of New Bedford; and Granitone Market, Incorporated, of Quincy; and 1 sample each, from Christy Mihos and Frank Paparo of Brockton; Foy's Food Market, Lodgen's Market, Incorporated, Atlas Food Mart, Incorporated, and Harry Richstein and Elick Lodgen of Quincy; Economy Grocery Stores Corporation of Cambridge; Sam Nornaro, Hut Market, Hyman Lass and Minas Lucas of Boston; Jacob Winocoor of South Boston; Morris Sawyer and Taunton Public Market of Taunton; First National Stores, Incorporated, of New Bedford; Brockelman Brothers, Incorporated, of Gardner; White Food Mart of Fall River; Brockelman Brothers, Incorporated, of Worcester; A. S. Pearce of Dorchester; Max Parker and Joe Rodney of Roxbury; Mohigan Market and Mary V. Grady of Salem; Growers Outlet, Incorporated, Rood & Woodbury, Wholesale Grocery Company, Incorporated, John Wagner, Saul Magidson, Wiesel Dickinson Market, Incorporated, Mathew Sommer, Stanley Sadowski, Oscar Spitzler, Incorporated, Del Vecchio & Arpaio, Incorporated, George Vinick, Rose Gordon, and Malcolm Neal, all of Springfield; Ted Posovsky of Orange; A. H. Phillips of Belchertown; Alexander Perdikis of Webster; A. G. Grenier of Huntington; A. B. Bradley of Deerfield; Growers Outlet, Incorporated, of Greenfield; Samuel Gilfin and Growers Outlet, Incorporated, of Holyoke; Henry Fernier of Pittsfield; C. Selvecki of Florence; and Pleasant Market, Incorporated, of Northampton.

Sausage which contained in excess of 2% cereal or vegetable flour was obtained as follows:

Three samples from Omaha Packing Company, Incorporated, of Lowell; 2 samples each, from State Sausage Company and Harry Winer (Star Provision Company) of Boston; Brockelman Brothers, Incorporated, of Worcester; John W. Wohrle of Pittsfield; John Moskal of Holyoke; and Chicopee Provision Company, Incorporated, of Chicopee; and 1 sample each, from Brockelman Brothers, Incorporated, of Gardner; and George Boepple of Worcester.

One sample of sausage which contained a compound of sulphur dioxide not so labeled and was also decomposed was obtained from Mrs. A. Bonacorse of Roxbury.

Sausage which contained a compound of sulphur dioxide not so labeled was obtained as follows:

One sample each, from Supreme Market, Incorporated, of Wollaston; The Great Atlantic & Pacific Tea Company of Orange; and Jack Paperno of Springfield.

Lamb patties which were decomposed were obtained as follows:

One sample each, from Brockelman Brothers, Incorporated, of Framingham; Fall River Public Market, Incorporated, of Fall River; and Saul Magidson of Springfield.

Bacon which was rancid was obtained as follows:

One sample each, from Rood & Woodbury, and Royal Super Market, of Springfield.

Two samples of chickens which were decomposed were obtained from Rood & Woodbury of Springfield.

One sample of pork chops which were decomposed was obtained from Fall River Public Market, Incorporated, of Fall River.

One turkey which was decomposed was obtained from Rood & Woodbury of Springfield.

There were 80 confiscations, consisting of 290 pounds of decomposed chicken; 40 pounds of decomposed poultry; 21 pounds of decomposed beef; 400 pounds of decomposed corned beef; 11½ pounds of decomposed calves' heads; 36½ pounds of decomposed lamb; 4 pounds of decomposed calves' liver; 208 pounds of decomposed pork; 1,385 pounds of decomposed pork trimmings; 2½ gallons of decomposed pickled pig's feet; 37¼ pounds of decomposed ham; 2 pounds of decomposed Scotch ham; 4½ pounds of decomposed pressed ham; 33 pounds of mouldy bacon; 1 wild boar that had been in storage, unclaimed, for five years; 25 pounds of decomposed veal steaks; 16 pounds of decomposed hamburg steak and meat scraps; 20 pounds of decomposed frankforts; 5 pounds of decomposed sausage meat; 50 pounds of decomposed butterfish; 690 pounds of decomposed fillets; 2 pounds of decomposed lobster; 100 pounds of decomposed smoked mackerel; 2,090 pounds of decomposed scrod; 280 pounds of decomposed grey sole; 7,060 pounds of decomposed squid; 2 pounds of decomposed swordfish; 1 Antarctic seal that had been in storage, unclaimed, for five years; 10 pounds of wormy black beans; 2 pounds of wormy kidney beans; 3 cases of canned beans and 16 cans of baked beans, the cans being bulged; 25 mouldy cantaloupes; 7 bunches of decomposed celery; 10 pounds of decomposed Greek cheese; 1 gallon of decomposed cider; 74 packages of wormy cocoa; 9 cans of cocoa, the cans of which were bulged; 19 pounds of wormy corn starch; 11 packages of wormy currants; 58 packages of wormy dessert; 24 packages of wormy egg noodles; 1 package of wormy cake flour; 21 packages of wormy pancake flour; 4 packages of wormy ice cream powder; 7 cans of wormy chocolate pudding; 19 cans of wormy rice; 3 cans of pears, 1 can of soup and 1 can of squash, the cans of which were bulged; 7 packages of wormy pimento; 1 package of wormy vanilla; 6 bottles of discolored lime juice; 27 cans of evaporated milk, 1 can of malt syrup, 6 cans of molasses, and 5 cans of salmon, the cans of which were bulged; 6 cans of wormy split peas; 6 packages of wormy soap mixtures; 1 package of wormy spaghetti; and 31 cans of syrup, the cans being discolored and having rusty tops.

The licensed cold storage warehouses reported the following amounts of food placed in storage during February, 1940:—26,430 dozens of case eggs; 770,190 pounds of broken out eggs; 318,067 pounds of butter; 1,987,401 pounds of poultry; 3,391,285 pounds of fresh meat and fresh meat products; and 3,868,254 pounds of fresh food fish.

There was on hand March 1, 1940:—2,400 dozens of case eggs, 948,965 pounds of broken out eggs; 470,633 pounds of butter; 10,453,722 pounds of poultry; 8,690,249 pounds of fresh meat and fresh meat products; and 14,032,717 pounds of fresh food fish.

The licensed cold storage warehouses reported the following amounts of food placed in storage during March, 1940:—298,380 dozens of case eggs; 706,005 pounds of broken out eggs; 237,215 pounds of butter; 1,587,458 pounds of poultry; 2,146,143 pounds of fresh meat and fresh meat products; and 2,104,665 pounds of fresh food fish.

There was on hand April 1, 1940:—268,590 dozens of case eggs; 709,770 pounds of broken out eggs; 269,397 pounds of butter; 8,602,870 pounds of poultry; 8,489,005 pounds of fresh meat and fresh meat products; and 9,220,756 pounds of fresh food fish.

The licensed cold storage warehouses reported the following amounts of food placed in storage during April, 1940:—1,836,240 dozens of case eggs; 2,036,637 pounds of broken out eggs; 323,600 pounds of butter; 1,497,047 pounds of poultry; 1,754,984 pounds of fresh meat and fresh meat products; and 3,889,668 pounds of fresh food fish.

There was on hand May 1, 1940:—2,015,220 dozens of case eggs; 1,738,978 pounds of broken out eggs; 238,986 pounds of butter; 6,904,002 pounds of poultry; 6,857,152 pounds of fresh meat and fresh meat products; and 6,495,823 pounds of fresh food fish.

The licensed cold storage warehouses reported the following amounts of food placed in storage during May, 1940:—2,230,110 dozens of case eggs; 1,943,704 pounds of broken out eggs; 1,033,686 pounds of butter; 1,907,646 pounds of poultry; 2,274,049 pounds of fresh meat and fresh meat products; and 11,137,319 pounds of fresh food fish.

There was on hand June 1, 1940:—4,171,650 dozens of case eggs; 2,568,266 pounds of broken out eggs; 1,010,839 pounds of butter; 6,291,522 pounds of poultry; 6,079,354 pounds of fresh meat and fresh meat products; and 10,856,549 pounds of fresh food fish.

The licensed cold storage warehouses reported the following amounts of food placed in storage during June, 1940:—485,430 dozens of case eggs; 1,092,375 pounds of broken out eggs; 3,455,719 pounds of butter; 1,964,864 pounds of poultry; 1,693,339 pounds of fresh meat and fresh meat products; and 15,819,298 pounds of fresh food fish.

There was on hand July 1, 1940:—4,187,430 dozens of case eggs; 2,621,279 pounds of broken out eggs; 4,092,615 pounds of butter; 6,542,833 pounds of poultry; 5,798,703 pounds of fresh meat and fresh meat products; and 20,792,294 pounds of fresh food fish.

The licensed cold storage warehouses reported the following amounts of food placed in storage during July, 1940:—378,960 dozens of case eggs; 1,262,004 pounds of broken out eggs; 1,490,953 pounds of butter; 1,412,848 pounds of poultry; 2,268,614 pounds of fresh meat and fresh meat products; and 16,698,308 pounds of fresh food fish.

There was on hand August 1, 1940:—3,629,100 dozens of case eggs; 2,821,712 pounds of broken out eggs; 5,000,222 pounds of butter; 6,137,491 pounds of poultry; 4,512,885 pounds of fresh meat and fresh meat products; and 28,032,407 pounds of fresh food fish.

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PUBLICATION OF THIS DOCUMENT APPROVED BY THE COMMISSION ON ADMINISTRATION AND FINANCE
7m—3-41—5614

vol. 28
STATE LIBRARY OF
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THE COMMONHEALTH

Volume 28
No. 1

Jan.-Feb.-Mar.
1941

CAMPING NUMBER

MASSACHUSETTS
DEPARTMENT OF PUBLIC HEALTH

1941

DEC 19 1941

THE COMMONHEALTH

QUARTERLY BULLETIN OF THE MASSACHUSETTS DEPARTMENT OF
PUBLIC HEALTH

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FOREWORD

Today, perhaps more than ever, it is important to assure health supervision, facilities for medical, dental and nursing care, social protection, and opportunities for recreation for children.

With the assistance of Dr. Lendon Snedeker, Chairman, Massachusetts Committee on Camps of the American Academy of Pediatrics, we are presenting a "Camping Number" of *The Commonhealth,* believing it most timely.

We have had the splendid cooperation of and contributions from

Massachusetts Department of Conservation, Division of Parks and Recreation

Massachusetts Committee on Public Safety, Planning and Technical Division

The Committee on Camps of the American Academy of Pediatrics

Massachusetts Tuberculosis League

The Children's Hospital

New England Deaconess Hospital

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Hodge Hanson, Recreational Planner and Landscape Artist

Lloyd B. Sharp, Executive Director, Life Camps, Inc.

Kenneth I. Wollan, Boston Juvenile Court

M. Luise Diez, M.D.
Director, Division of Child Hygiene.

GROWTH OF THE MODERN CAMPING MOVEMENT

LLOYD B. SHARP
Executive Director, Life Camps, Inc.
Director, National Camp

Aside from the historical facts of the growth of the modern camping movement in this country there have been many pressures and influences which have caused the movement to follow along certain trends and patterns. To mention briefly a few of these will be sufficient to indicate the course that the camping movement has followed and to indicate the direction it will probably take in order that its fullest benefits may be realized.

From the philosophical point of view camping is a *way of life.* It has implications which lie deep in the history of our country and the struggle of our people and the part that nature has played. The word camping means to each individual what he puts into it. The connotation in this brief article refers to the broader conception of life or to a way of living and therefore relates to the way people lived and live close to nature in the open.

First Campers

The first campers in this country were the Indians. They were wholly dependent upon nature for their food and shelter. They knew the plants and roots and knew their many uses. They built houses and shelters best adapted to the surrounding country, to material at hand and to the climate. They were agriculturalists—developed drought corn, practiced soil fertilization, made irrigation ditches and have made many other valuable contributions of benefit to us. From the standpoint of appreciation of his surroundings, care of self, resourcefulness, utilization of natural resources and the practice of simplicity of living, the Indian was a good camper. In quest of better understanding and love of the out-of-doors as an essential part of our camping movement, we owe much to our first American campers.

The era of explorers, traders, and trappers marks the second period of camping. These rugged individuals had to know the way of the woods in order to make their expeditions successful. With the help of friendly Indians it was possible for them to accomplish their goals. The stories of the traders and trappers add a significant part to the larger concept of adventurous camping.

With the landing of the Pilgrims began a period of *settlement* in this land. The people were actually camping. The first thing a party from the Mayflower did when it went ashore was to select a camp site. For many years people came from other shores to this country, built homes, worked together, and gradually extended themselves farther and farther west. The pioneers in their sturdy homes on wheels camped their way across the country seeking prosperity and security. They lived a life of daring and adventure. They were on their own as individuals and families—camping in the fullest degree. Out of their pattern of living was created our concept and form of democracy. It might be said that camping and democracy started together in this country. A careful study of their progress will show that *shelter, food, self-occupation, spiritual influence, group living, and community effort* were basic elements in the development of our country.

At the time of the signing of our American Constitution approximately ninety-eight per cent of the people lived in a strictly rural area.

Today over sixty per cent of the people live in large cities and are necessarily subjected to much regimentation, coercion and regulation along with all all their modern conveniences. It is not contended here that we should abandon our social and economic progress and go back to the days of the Pilgrims and early settlers. Not at all. It is maintained, however, that these principles to which reference has been made are as fundamental and necessary in our present day living as they ever were. Also, there is a better opportunity to experience them in a favorable camp situation.

Organized Camps

The earliest reports of what can be called an organized camp do not give us a very clear picture of the motives or purposes. It was not until the 1870's that an organized movement may be said to have started though a few camps existed before that time. Some of the earliest camps were influenced by the original appeal of adventure in the out-of-doors but, alas, they soon yielded to the march of modern events, and organized activities from the cities gradually worked their way into the camps. Their purposes and practices changed accordingly.

As early as 1872 the movement of "Fresh Air Work" was started and has continued to the present time, though it is rapidly dying out. The purpose of this movement was to get the children out of squalid conditions in the city to the country fresh air and sunshine. Its benefits were judged largely by gain in weight. Later this developed into a more positive health program and has made favorable progress. Organized games and sports movement, a product of the city and school life again influenced camping to become strongly athletic and bodybuilding. This has brought the playfields, basket ball, hand ball, and tennis courts, the track and field events, and nearly all other city sports to the woods, gradually crowding out the opportunities best offered in the camping environment.

Influences and Goals

With the increase of leisure time in our cities there was a surge throughout the country for recreational facilities and programs. This also had its influence upon the camping movement, and much of the program, methods and leadershp found its way into camps, bringing with it the fully equipped playground, slides, swings, teeter-tooters, giant strides, and all.

Health has always been an important part of the camping program. Depending somewhat upon individual and organized points of view it has very often been regarded as the chief value of camping experience. The concept of health has changed from a state of body condition to the practice of healthful living. This latter view has not as yet fully found expression in our modern programs but in the future will play more and more a greater part.

The building of character as a chief goal in camping has been stressed by various agencies and as a result character building has become an integral part of the camping movement. There is not less emphasis upon character building as an aim today but it—meaning character building—is being interpreted more specifically in terms of better ways of thinking and acting. As a process it tends to merge into a larger purpose.

Education

The present trend is for the education of the whole child, desiring to bring about in each individual the greatest amount of and the most wholesome total personality growth and development. With all kinds of groups and agencies conducting camps—private, religious, institutional, and welfare, it was inevitable that the next major emphasis in the camping movement was a combination of these goals coming to the focal point of total education of the child as the present need. This does not mean the relegation of the physical, spiritual, health, character building and other values to less important places but indicates more the *oneness* of the purpose and process. This trend seems to be well started. In these days of uncertainty special stress is being placed upon the need for effective citizenship and the practice of the democratic way of life.

Public Responsibility

The camping movement has been fostered generally by private and organizational effort. It is only in recent years that camping has been projected as a public function. This recognition and support is sure to become increasingly a larger part of public responsibility. Schools are beginning to recognize the educational significance of camping and to make it an integral part of their programs. To make education really functional, much of the school program in the future will have to be carried on outdoors. Since the camping program is largely one of learning through experience, it will undoubtedly play an important role in the future development of the schools.

The Future

If we are to think in terms of the future direction of the camping movement, we can perhaps best go back to a rugged simpler life and recapture some of the more basic elements of living as our guide, not losing sight, however, of total education for life in a democratic state as our goal. No matter how much advancement we make in modern improvements, man's nature does not change. His soul and emotions are the same and respond to the same things that have always touched them. Material things do not actually play the most important role in his life. He is still, in a spiritual sense, a part of nature and needs to get back to it for a large part of his life.

The pattern of organization in our camps will necessarily change to make possible the outcomes implied in the newer goals. These outcomes are not sufficiently possible in a centralized or regimented plan of organization. Already a movement of decentralization in camps is started and should continue. In this plan of organization the campers are divided into smaller groups of six, seven, or eight, with adequate leadership, and are on a semi-independent basis. In this small group life they provide for their own food, they plan and cook most of their own meals, have much to do with planning and building their various types of shelters, plan their own program, and in general provide for their own comfort, welfare, and happiness.

Camping in the midst of nature and of the more vigorous and realistic type can make a vital contribution to the building of better citizens and to the implementation of our ideals of democracy—certainly, these should be our chief goals.

A NATIONAL CAMP COMMITTEE FOR THE PROMOTION OF BETTER HEALTH CONDITIONS

Warren R. Sisson, M.D., *Chairman*
The Committee on Camps of the American Academy of Pediatrics

Three years ago the medical profession under the aegis of the American Academy of Pediatrics organized a committee to act as an advisory group in health matters for summer camps. In this way there was initiated the first organized effort of a national group of physicians to promote summer camps for children. The American Academy of Pediatrics is not attempting to direct the camping movement except as it is concerned with questions directly relating to the health of children. It is not only sponsoring the summer camp movement, but its function is to assist a very able group of educators in giving children a healthful, enjoyable, and profitable vacation during the summer months.

One of the fundamental principles which experienced camp leaders have emphasized is that a camp assumes full responsibility for the child for every twenty-four hours that he is in camp. This is in contrast to the responsibility of the average schoolteacher, who may supervise his pupil but a few hours each day. Because of this continuous responsibility, the summer camp must provide every possible safeguard for the camper. This should be supervised by competently trained physicians interested in problems of public health. It involves the proper selection of camp sites, proper water supply, physical examination of staff and campers, careful regulation of diets, and constant supervision by physicians and nurses. It is most difficult in many instances, where camps are situated in isolated places, to carry out satisfactory health regulations. The use of pasteurized milk, the proper disposal of excreta and suchlike, afford many real problems for the camp director, but all such obstacles should be overcome.

One of the first functions of the Committee was to formulate a set of standards for the medical supervision of camps. It was fully realized that such standards could not be applied to all camps, but represented goals toward which they might reasonably be expected to progress. These standards are discussed by Dr. Dorothy Whipple in another article in this issue of *The Commonhealth.*

Other activities of the Committee should be briefly mentioned. Perhaps one of the most important of these has been the formation of state committees to promote most effectively the health programs of local camps. In Massachusetts the Camp Committee is composed of the following members from different parts of the state: Dr. Lendon Snedeker, Chairman, Boston; Drs. Edward P. Bagg, Jr., Holyoke; Rachel L. Hardwick, Boston; George Kahn, Boston; Merritt B. Low, Deerfield; Harold E. Perry, New Bedford; Norman A. Pokorny, Springfield; Warren R. Sisson, Boston.

The members of this Committee welcome any opportunity to take an active interest in the health problems of our Massachusetts camps. Last year they were instrumental in acquainting a great many camps with the Health Standards drawn up by the National Committee. The present issue of *The Commonhealth* was made possible by their cooperation.

The National Committee on Camps is also seeking the enactment of statutes throughout the United States which will provide better health protection for summer camps. In many states, such as New Hampshire, this has been very effectively accomplished, but in many other states summer camps are not subject to regulation by the state health authorities.

One of the chief problems of the Committee has been to find physicians who have had intimate experience with camps and know their medical needs. Interest and cooperation of the medical profession has increased in a most encouraging manner and a new period of constructive activity with existing camps is assured.

HOW CAMP MEETS THE NEED OF CITY CHILDREN

S. MAX NELSON, *Director*
East Boston Social Centers

Not just "city children" but children from the congested areas whose summer vacation is mostly a succession of days spent idly on hot, humid streets amid sights and smells, confusion, noise and traffic, dirt and a wanness that is the picture where poverty, overcrowding in bad housing, and the impact of a collection of social lacks makes life dull and and sluggish. Occasionally a neighborhood fire or the lucky windfall of a dime for the movies may high light otherwise long boresome days which terminate only when the child drags himself to an uncomfortable bed in a stifling tenement.

It is not probable that anyone connected with organizations which sponsor summer camps for children from such neighborhoods begins to realize, fully, the tremendous change and the benefits derived therefrom which affect the lucky child who "gets on the camp list." Experienced camp directors have a pretty good idea of these benefits but even they cannot measure the flow, into the child's soul, of those satisfactions from a camp experience which tend to become basic character material and which, combined with proper rest and feeding, spell the change, so evident in the child at the end of his camp period.

Obviously only a small proportion of the children who need camp, get there. Estimates range from three to ten per cent. In localities where such facilities are provided by private agencies only, it is unlikely that this small percentage can be increased. Summer camping for children from underprivileged areas is, demonstrably, a powerful factor in helping them to combat the effects of the "lacks" which they must face the rest of the year. Since these children constitute the juvenile population of those sections of the city which show the highest incidence of health disorders due to lack of resistance, and because eventually the cost of treatment of these illnesses and of behaviour problems, delinquency arising therefrom, etc., becomes a part of the city tax burden, it would seem self-evident that, at the very least, demonstration camps for such children, ably led and supervised by health and medical associations, might well be organized as public enterprises out of tax funds. Certainly prevention through such measures would be less costly than the cures which inevitably become necessary without them. With our present knowledge of efficient methods in summer camping for city children, at minimum cost, such a program is practical.

The needs of the city child in camp run the gamut from the purely physical to the deeply spiritual. There is no all-embracing influence except summer camp which can so completely affect and satisfy such needs.

In terms of actual camp practice these needs divide themselves into three main divisions; i.e., rest, proper diet and real satisfactions. Considerable experience and wisdom is called for in arranging the volume of activity, its pace and direction, with due regard to rest and sleeping time. Care must be exercised that the slowly accruing benefits of rest hours are not lost in unwisely long swim periods or overlong hikes. A program which capitalizes on the rural setting of the camp and eradicates formal "city-type" activities in favor of "close-to-Nature" pursuits, calling for individual and group observation and initiative, will go far to meet the spiritual needs of the camper. Right diet, in proper quantity, nicely served in a gracious atmosphere (attainable even in large institutional camps without difficulty) will help to round out both cheeks and souls.

The children who grow up in the less desirable neighborhoods of large cities, like all children, tend to identify themselves with the people who make up their everyday world. When such children are fortunate enough to be chosen for camp they enter a new and important phase in their development. Because the camp environment is novel, arresting, attractive and acceptable, they tend to accept the new patterns and exhibit the behaviour which camp provides. This contact with new places and new people, in positions of leadership, becomes the deciding influence in producing a deep spiritual change which becomes apparent in most children during their camp stay. Those in charge of camps are well aware of the extreme importance of providing leadership worthy of the children's confidence and ready emulation. The "treatment" so provided may be brief, two or three weeks perhaps, but the prescription has a power manifested in long-time results. Those of us who observe these children twelve months in the year recognize this response to leadership, environment, and program as little short of miraculous. Identification with new heroes, acceptance of new behaviour patterns, carry over into the city existence of campers and becomes a permanent part of their lives.

Good camp programs, a combination of rest and activity, are centered around interests which result in giving real satisfactions to those who are attracted to them. We find that projects which include walks ("exploring" if you will) with a trained nature study leader; pioneer projects with real wood chopping and outdoor cooking; forestry training and tree planting; care of animals, such as horses; dramatic presentations which make the most of the woodland setting; overnight trips and simple astronomy; sunrise from the top of a hill or a mountain, to be the stuff from which not only dreams are made, but the very fabric of enduring stable memories affecting the everyday life and conduct of children who have been participants in such an experience.

Sometimes it is only a little leaf collection, a few, long-dead insects in a little frame, prized among the child's possessions in the city flat which help to bring back the memories of woodland trails and misty mornings or of crackling campfires under the night sky. Small things perhaps, but symbols of great compensations for the humdrum and shallow experiences and life of the city neighborhood.

One cannot observe the farewell between a boy and the horse he has come to love in camp, a hasty parting while the departing bus honks warningly, without being reminded strongly of the primitive longing in that boy's heart for an animal to love and care for. Two weeks are a short time but memory will serve him well and there is always the possibility of reunion another summer. Camps may not be able to afford horses but any camp can support a safe dog, a goat, a few chickens or a sheep. Such pets are of the very essence of a satisfactory camp experience.

Then there are the "skills" which a city child can acquire in camp. In addition to the important and almost universally provided swimming and instruction in swimming and life saving, most camps provide opportunities for practice in precision activities, such as archery, and in crafts, especially crafts connected with the use of primitive woods materials, (although we did hear of a camp last summer which sent for neatly packaged materials, all of which were obtainable on their own camp site, which had been cut to length and processed so that a very professional result might easily be obtained in a few hours of work. This placing of the result above the means and the opportunity of creating from the source, seems to us inexcusable even though it was possible for the camper to take home a more finished product.)

To meet the needs of children from our less fortunate districts who are fortunate enough to come to camp is not necessarily an expensive process. The principles are few but important: a reasonably safe camp site; strict observance of health precautions and an abundant supply of pure water; adequate shelter and restful beds; adequate diet, graciously served; the proper relationship of activity to rest; a program of thrilling adventure with as few "canned," city-like interests as possible; and last and most important, a staff which loves the job and understands the needs and eager, impressionable natures of the children who pile off the bus for the two most precious weeks of their lives.

CAMP SANITATION

JOSEPH C. KNOX, *Assistant Sanitary Engineer*
Massachusetts Department of Public Health

Massachusetts, because of its geographic location and topography, is one of the Nation's most popular summer playgrounds, attracting yearly large numbers of vacationists and tourists. To accommodate in part those enjoying our recreational facilities, numerous types of camps have come into existence. On the shores of our inland lakes, on the slopes of the Berkshire Hills, and along the North Shore and picturesque Cape Cod, are organized recreational camps for children and adults, operated by civic, health, and philanthropic organizations or by private individuals solely for financial gain. Along the highways in ever-increasing number are overnight and trailer camps, while at the seashore beach resorts trailer and tent camps are becoming very popular.

The problems of sanitation at these camps have long been the concern of health and various civic organizations. The Massachusetts Department of Public Health at various times has conducted State-wide investigations of sanitary conditions at recreational camps, and at the request of local boards of health and camp officials has advised relative to the water supply, sewerage, garbage, and refuse disposal and other problems of camp sanitation. The Department also published in 1929 *Recommended Health Standards for Summer Camps*. In 1936 the Department of Public Health and the Department of Public Safety were ordered by the Legislature to investigate the conditions at overnight and trailer camps in the State with a view in part to ascertaining the need of legislation to control matters of sanitation. This investigation showed the need of mandatory powers to control sanitation at these camps, and proposed legislation, applicable also to recreational camps, was recommended but failed in enactment. Such legislation had previously been proposed for a period of some ten years by various organizations who recognized the work the Department was doing in its limited advisory capacity. It was not until 1939, however, that the General Court, finally taking cognizance of the tremendous growth of camps and the critical need of suitable legislation to control sanitary conditions, enacted Chapter 416 of the Acts of 1939. This act provides briefly, as follows:

That all recreational camps, overnight camps or cabins and trailer camps shall be licensed by the local boards of health, and that no person shall conduct any recreational camp, overnight camp or cabin or trailer camp, unless he is the holder of a license granted after a hearing by the board of health of the city or town in which the camp is located. This license, unless previously suspended or revoked, expires on December thirty-first in the year of issue. The licens fee is fifty cents. The local board of health is required to notify the State Department of Public Health of the granting of such license, and the Department must inspect the premises to determine that the sources of water supply and the works for the disposition of the sewage are sanitary. If the Department finds the source of water supply to be polluted or the sewage disposal works to be unsanitary, the local board of health is forthwith notified and they must prevent the use of any water supply found to be polluted. The licensee, within thirty days of notification, must correct conditions to the satisfaction of both the Department of Public Health and the local board of health, or the license will be suspended or revoked by the local board of health. The act further provides that the local board of health may adopt, and from time to time alter or amend, rules and regulations to enforce the provision of this law and a copy of these regulations must be posted in a conspicuous place near the entrance of the camp.

The Department has examined, particularly in regard to water supply and sewage, as specfied by this act, 634 licensed camps in 166 municipalities during 1940.

To assist the local boards of health in adopting rules and regulations as provided under said Chapter 416, the Department of Public Health prepared suggested rules and regulations which may be considered as the standards recommended by the Department for sanitation at various camps. These rules and regulations have been adopted in whole or in part by some ninety-two boards of health, but regardless of their adoption or degree of enforcement by the local boards of health, camp authorities and owners should conduct their camps in accordance with them. These suggested rules and regulations are as follows:

Suggested Rules and Regulations for Recreational Camps, Overnight Camps or Cabins and Trailer Camps

Section 1. *Registration and License*

The management of any organized camp in the town of . . . . covered by Chapter 416 of the Acts of 1939 shall apply in writing annually for a license to the Board of Health of . . . . . . This application shall state the location and type of camp, the approximate maximum number of persons by whom it is to be used, the probable duration of occupancy, the proposed sources of water and milk supply for the camp, and the proposed method of sewage and garbage disposal. If the camp is used the year around, such application shall be made annually not later than January 1, or if used during only a portion of the year, at least 30 days in advance of the date when the requested license is desired to take effect.

Section 2. *Camp Site*

The camp site shall be such that it is practicable to provide and maintain proper sanitary facilities. The location shall be on porous, well-draining soil, and shall afford facilities for obtaining a good water supply and a safe method of sewage disposal.

It shall be of adequate size to prevent overcrowding. Each camping unit shall contain not less than 400 square feet of usable space, and no unit shall be permitted to accommodate more than one overnight cabin or tent.

No camp shall be established on the watershed of a public water supply until proper sanitary facilities have been provided and all sanitary facilities shall be in accordance with the rules and regulations for the sanitary protection of public water supplies made by the Massachusetts Department of Public Health under the provisions of Section 160, Chapter 111, General Laws.

Section 3. *Plan of Camp*

Every camp shall have available for inspection a plan or sketch indicating the location of all local sources of water supply and other sanitary facilities including all toilets, cesspools, and receptacles for garbage and refuse, and signs shall be posted indicating the location of such facilities.

Section 4. *Water Supply*

Every camp shall have a water supply of safe, sanitary quality, and sufficient in quantity for the maximum population using the camp at any time. Such water supply shall be easily obtainable from its source or from faucets or bubblers on a pipe distribution system. Dipping of receptacles into the source of supply shall not be permitted. Common drinking vessels shall not be provided or permitted.

Drinking fountains shall be of sanitary design and construction. Any source of water supply, the water of which is found to be polluted or of questionable quality, shall be posted as unsafe.

Section 5. *Sewage and Waste Water Disposal*

No camp shall be operated without facilities adequate for the proper disposal of the sewage and waste water. There shall be separate accommodations for each sex, so located as to be easily accessible to all parts of the camp. Camps so located and equipped that water under suitable pressure and public sewers are available shall be equipped with flush toilets and connected with the public sewerage system. Camps not so located shall be provided with equipment adequate for the disposal of the sewage and waste water in a sanitary manner. There shall be at least one toilet seat for each fifteen campers when the camp is operating to full capacity, and one urinal of vitreous material shall also be provided for each twenty-five men.

No privy shall be located within fifty feet of any kitchen, dining room, mess hall, or other place where food is prepared or served. Toilet structures shall be fly-tight, well-lighted and ventilated.

In cleaning septic tanks, cesspools, chemical toilets, privy vaults or pits, the contents shall be removed and disposed of in a manner satisfactory to the Board of Health of . . . . . . so that they will not become a menace to the public health, create a nuisance, or contaminate any water supply or bathing place. Vault contents shall be treated frequently by sprinkling with chloride of lime or a compound equally effective for preventing nuisances.

Section 6. *Disposal of Garbage and Rubbish*

Every camp shall be provided with metal, tight-covered receptacles for garbage, placed at a suitable point or points at the camp and sufficient in number to contain all such garbage. All garbage shall be deposited in them. The contents of these covered receptacles shall be removed daily when the camp is in use and, under proper supervision, buried or disposed of in a sanitary manner so as not to create a nuisance.

Garbage shall not be thrown or deposited in any ravine, ditch or gutter, on any street or highway, into any waters, or be permitted to remain exposed upon the surface of the ground. Garbage receptacles shall be thoroughly washed at frequent intervals.

Every camp shall be provided with suitable receptacles with tight covers for rubbish, and all waste papers, bottles, and tin cans shall be placed in them. The contents shall be removed at least twice a week when the camp is in use and burned or otherwise disposed of in a sanitary manner under proper supervision.

Section 7. *Food*

The quality and handling of all foods sold or offered for sale on the camp premises shall conform to the regulations of the Board of Health of . . . . . . and to the Tercentenary Edition of the General Laws as amended or as may hereafter be amended.

Section 8. *Bathing Places*

No bathing place shall be established or used which is subject to dangerous contamination. Swimming and wading pools and bathing places shall be operated and maintained in accordance with the recommendations of the Joint Committee on Bathing Places of the Conference of State Sanitary Engineers and the American Public Health Association.*

Section 9. *Shower Baths*

Camps provided with shower baths shall have separate compartments for each sex. A minimum of one shower head for each sex shall be provided for camps up to twenty persons, and one additional head for each additional twenty persons or fraction thereof. Concrete floors and suitable waste water disposal shall also be installed.

Section 10. *Living Quarters*

Living quarters, including dormitories, dining rooms, kitchens, bath and toilet rooms, laundries, and other shelters shall be properly screened, well-ventilated and lighted, free from vermin and insects, and the floors raised not less than twelve inches from the ground. Screen doors shall be of the self-closing type. The floors of all kitchens, dining rooms, bath, toilet and wash rooms and laundries shall be watertight. No windows shall open directly into any enclosed garage space.

All plumbing fixtures shall be properly trapped and vented and made sanitary in every particular, and all piping conditions shall be in accordance with the Plumbing Rules formulated by the State Examiners of Plumbers as required by Section 8 of Chapter 142 of the General Laws.

Section 11. *Caretaker and Maintenance of Sanitary Conditions*

The camp shall be supervised by a capable manager or caretaker who shall reside at the camp or visit it every day when it is occupied. It shall be the duty of the manager or caretaker to keep the camp and its equipment in a clean and sanitary condition.

The owner or management of each camp shall assume responsibility for maintaining the camp in proper sanitary condition in accordance with these rules and regulations, copies of which shall be posted at a conspicuous place in the camp. The camp when closed for the season shall be left clean and in a sanitary condition.

Section 12. *Communicable Disease*

Whenever a case of disease dangerous to the public health is discovered or any unusual amount of illness occurs in any camp, the person in charge shall at once notify the Board of Health of . . . . . . The patient shall be isolated and not removed from the camp except by order of the board of health.

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* Copies of this report may be obtained upon request from the Division of Sanitary Engineering of the Massachusetts Department of Public Health.

Section 13. *Trailer Camps*

The foregoing regulations shall apply to trailer camps or parks. The following special regulations also shall apply:

1. Each trailer unit shall have an area of not less than 600 square feet, with suitable markers set at each corner. No unit shall be permitted to accommodate more than one trailer. The minimum distance between trailers, a trailer and a building, or a trailer and a property line, shall be ten feet. The minimum distance from a street line to a trailer shall be fifteen feet.

2. No toilet installed in any trailer coach shall, except in case of sickness, be used while the trailer is parked in a trailer camp. Sink and other wastes shall not be discharged upon the ground, but shall be discharged into a suitable receptacle or through a connection with a pipe leading to a sewer, cesspool or other subsurface disposal works.

Section 14. *Penalty*

Section 32E of Chapter 416 of the Acts of 1939 reads as follows:

> "Whoever conducts, controls, manages or operates any camp or cabin subject to sections thirty-two A to thirty-two C, inclusive, which is not licensed under section thirty-two B, shall be punished by a fine of not less than ten nor more than one hundred dollars."

The rules and regulations relative to water supply and sewerage may well be discussed briefly, particularly in relation to the results of the examinations and recommendations of the Department during 1940, the first year of operation of Chapter 416 of the Acts of 1939.

While a camp may offer many advantages, it is of little value if a safe and adequate water supply cannot be obtained. At many camp sites a public water supply is available while at others a source must be developed by the camp authorities or owners. In most instances a supply may be obtained from the ground by means of springs, from tubular wells located in sand or gravel formation, or from wells of the dug type. Such sources of supply should be located remote from any source of pollution, such as sewage disposal works, etc., and adequately constructed to prevent the entrance of surface drainage or foreign matter. Wells located in rock formation should be viewed with suspicion as pollution has been known to travel long distances through cracks or fissures in the rock. Lakes, ponds, or other open bodies of water are unsatisfactory sources of water supply at camps as they are subject to chance pollution and in most instances are of greater value to the camp for recreational activities. The water supply should be made available at taps throughout the camp to eliminate the possibility of contamination by the use of utensils and chance pollution in transportation. Secondary sources of water supply from unpotable sources should be used only for flushing purposes and not for washing or oral cleansing. Water from such sources should be supplied through separate distribution systems with no available taps from which water might accidentally be taken for domestic use. Care should be taken that there are no cross connections between the drinking water supply and any unpotable secondary supply. The summary of the results of the examinations of camp water supplies in 1940 shows that a considerable number were unsatisfactory because of their location in the immediate vicinity of works for the disposition of sewage or waste water. In most of these cases the Department recommended that new sources of water supply be installed remote from sources of pollution. If, however, the quality of the water of the wells had not been materially affected by the disposition of sewage in the ground, it was recommended that the sources of pollution be removed from the vicinity of the wells if such procedure were more economical. Many of the improvements recommended relative to water supply were in connection with dug wells which were not properly protected from the entrance of surface drainage and foreign matter. The recommendations in this regard were that the walls of the wells should be made watertight for a depth of at least four feet below the ground and extended above the ground surface to form a watertight curb to exclude surface drainage; also that a watertight cover of concrete or other durable material should be provided.

All sewage and waste water at camps should be disposed of by subsurface means as a protection to health and to prevent the occurrence of nuisances. All such works for the disposition of sewage and waste water should be located remote from sources of water supply and from ponds and lakes used for bathing and recreational purposes. It is, of course, advisable that sewage be disposed of by a connection with a public sewage system, but very few camps are located where such a system is available. The liquid wastes at camps may be disposed of by means of septic tanks with subsurface disposal of the effluent or by means of cesspools. The effluent from septic tanks should be discharged into subsurface pipes, laid in coarse gravel or crushed stone with open joints so that the liquids will seep through them. The length of these pipes or drains will depend on the quantity of sewage and the porosity of the soil. Cesspools are usually constructed of fieldstone laid without mortar to within two feet of the ground surface above which point the stone is laid in cement, curbed over and provided with a cover. In some cases it is necessary to provide an overflow with a tee to discharge the liquid below the flow line of the cesspool into an overflow cesspool or subsurface leaching drains. The entrance of grease into subsurface disposal works and subsequent clogging can be eliminated to a considerable extent by the installation of grease traps, particularly in connection with wastes discharged from kitchens. Where privies are maintained at camps, they should be located at points where the ground water level is at a considerable elevation below the ground surface and should be so constructed as to prevent access to the vault by flies, insects, or rodents. Odors from such structures can be reduced by frequent applications of chloride of lime or by covering the contents of the vault daily with fresh earth. The most objectionable conditions relative to the disposal of sewage and waste water at the camps examined in 1940 were from the discharge of sewage or sink drainage directly onto the surface of the ground, or from inadequate subsurface disposal works resulting in the overflow of sewage onto the ground. In many camps wash water and shower bath drainage were discharged directly onto the ground surface and in such instances the Department recommended that such waste be disposed of by suitable subsurface means. These recommendations were carried out in many instances by the installation of dry wells which were provided with lateral filter trenches when necessary. In connection with the disposal of waste water at trailer camps, the Department has recommended that suitable covered receptacles be provided at each trailer site and the contents emptied periodically into the sewage disposal works or by other subsurface means.

The Department has available certain literature relative to water supply systems and rural sanitation. These publications contain typical designs which are applicable to camps and will be forwarded upon request.

MASSACHUSETTS STATE PARKS AND STATE FORESTS

EDGAR L. GILLETT, *Director*
Division of Parks and Recreation
Massachusetts Department of Conservation

There are seventy-five State Forests and there is hunting and fishing under department regulations on practically all of these forests except, of course, on the areas set aside as wild-life sanctuaries. There is a total of about 175,000 acres in the combined forests ranging in size from three acres at Campbell Falls State Forest in New Marlborough to the Myles Standish State Forest at Plymouth with 10,910 acres, and October Mountain, Lee, 14,189 acres.

There are twenty-seven State Forests on which recreational areas have been developed. However, on account of a reduced budget the last few years it has become necessary to close five of the areas as far as regular administration is concerned so that there are at present twenty-two recreational areas with facilities on the State Forests. These are located on the following list of forests:

Myles Standish State Forest, Plymouth, Charles L. Cherry, Wareham 9323-12
Harold Parker State Forest, Andover, Guy Evans, Danvers 1422-4
Willard Brook, Ashby, James Hayes, Ashby 18-11
Spencer, Spencer, Howard Hurley, Spencer 2177
Douglas, Douglas, Howard Hurley
Brimfield, Brimfield, Howard Hurley
Federation of Womens' Clubs State Forest, Petersham, Joseph L. Peabody, Winchendon 404
Mount Grace State Forest, Warwick, Joseph L. Peabody
Otter River State Forest, Winchendon, Raymond T. Wilder, Winchendon 446 W-4
Erving State Forest, Erving, Arthur Sears, Orange 188 M-1
Pittsfield State Forest, John A. Anderson, Pittsfield 5178
Windsor State Forest, John A. Andersen
Mohawk Trail State Forest, Charlemont, Horace Brown, North Adams 984-4
Savoy Mountain State Forest, Savoy, Lee B. Sanderson, North Adams, 997 W-4
October Mountain, Lee, W. R. McCulloch, Lee 613 W
Chester-Blandford State Forest, Chester and Blandford, Raymond T. O'Connor, Westfield 600
Peru State Forest, Peru, Raymond T. O'Connor
Beartown State Forest, Great Barrington, Monterey, Tyringham, Lee, John M. Lambert, Great Barrington 156 M-3
East Mountain State Forest, Great Barrington, John M. Lambert
Otis State Forest, Otis and Sandisfield, John M. Lambert
Sandisfield State Forest, Sandisfield, John M. Lambert
Bash Bish Falls State Forest, Mount Washington, John M. Lambert
Campbell Falls, New Marlborough, John M. Lambert
Granville State Forest, Granville, Harold Sattler, Granville 3362
Tolland State Forest, Tolland and Otis, Harold Sattler

There are six State Parks as follows: Salisbury Beach Reservation at Salisbury Beach with 519.96 acres, on which there is bathing on the beach under life guard supervision, together with comfort stations and bathhouse, and a large area is being developed for tenting and trailer areas, together with an inland pool for bathing, principally for the convenience of those using the tenting and trailer area. The Standish Monument Reservation at Duxbury has twenty-five acres. There are picnic tables available and a charge of ten cents is made for going to the top of the Monument. The Lindon Bates Memorial Park located at Hancock, overlooking the Berkshire Hills to the north, south and east, and the Lebanon Valley in New York State to the west, contains about 224 acres. This is a very sightly location being reserved more as a wildlife sanctuary. It is located just across Route 20 at the top of Lebanon Mountain, just south of the Pittsfield State Forest. The Robinson State Park, located at Agawam and Westfield, contains 1,108 acres, has picnic areas with fireplaces and tables, and additional facilities are being developed there at the present time. The Roland C. Nickerson State Park at Brewster has 1,707 acres. There are picnic areas, camping facilities and bathing, and this area is just a short distance from ocean bathing on the Cape. The Joseph Allen Skinner Park at South Hadley contains 375 acres. The Summit House is at the top of the mountain with its many traditions and a beautiful view of the entire Connecticut Valley. There are many trails leading over the mountain and a picnic area is being planned for this season. The charges for the use of the different recreational facilities are as follows:

Fireplace and table	2 hours	$ .25
Fireplace, community	2 hours	1.00
Parking		.25
Parking, bus		1.00

(Including fireplace or table for two hours assigned and/or bathing beach or bathhouse)

Tent or Trailer space	Day	$ .50
Tent floor	Day	.75
Tent and floor	Day	1.00

(Minimum 48 hours, maximum 2 weeks.)

Log cabin, 1 room	48 hours	5.00
Log cabin, 1 room	1 week	15.00
Log cabin, 3 rooms	48 hours	6.00
Log cabin, 3 rooms	1 week	20.00

(Minimum 48 hours, maximum 2 weeks.)

Firewood	10c a bushel or bundle
Firewood	20c a day

(In addition to rental of tent, trailer space or cabin.)

There are, of course, many back roads that are suitable for hiking, horseback riding, and for skiing across country in the winter, on most of these forests. In all cases arrangements should be made with the Supervisor in charge of reservations. As explained, there are no facilities at present for organized camping, but this matter is receiving the attention of the Department which realizes the need for this type of recreation. There are, however, cabins and locations that could be made available for group camping.

PLANNING THE JUVENILE GROUP CAMP

HODGE HANSON
Recreational Planner and Landscape Architect
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as Recreational Planner

The planning of a juvenile group camp implies the need for definite objectives. No camp development can be adequate unless it is considered in terms of its ultimate use. This conception must be based on facts and not on fancies; therefore, a thorough survey plus an analysis and statement of purpose should precede any successful camp development. Camping should be thought of as a venture in socialized living, and plans should facilitate the enjoyment by groups of people of leisure time spent in the open. It is not enough to build a camp in an area that is naturally beautiful. One should consider the type of people using the camp, the capacity at any one time, and the activities to be carried out.

The camping movement developed gradually, and up to 1900 there were only sixty camps in the United States. Rapid growth took place after the World War, and today there are over 7,000 active organized camps. At first equipment was meager and definite programs were lacking. Later camps became almost military in plan. The layout was stiff and formal, and buildings were crowded together. Camp sites deteriorated because of too intensive use, and the situation was made worse by a lack of planning for future needs. Gradually a reaction set in and too much freedom resulted.

Out of this varying experience has developed the camp of today, characterized by an informal but orderly arrangement of its facilities. The size of the camp has been restricted and it has been decentralized in order to avoid the evils inherent in overcrowding. Equipment has been simplified and yet is adequate. Emphasis is laid on a program which is stimulating and still allows freedom of choice.

Decentralization is achieved by a reduction in the total size of any one camp and its subdivision into subordinate units. Groups of 100 to 150 campers are divided into units of twenty to thirty people. These are located sufficiently close to headquarters for convenient access, yet far enough away to insure privacy. Buildings are adequately spaced and barracks arrangements are discouraged.

Such decentralized units include a washhouse and latrine, sleeping cabins, an outdoor kitchen, and, if possible, a separate lodge for unit programs in bad weather. It should be possible for each unit to carry on its activities independently of the other sections or the central group. The buildings in a unit must be sufficiently separated to allow for good fire control and washing and toilet facilities should not be farther than 150 feet from the farthest sleeping cabin.

The modern camp designer will try to house his campers in four- or eight-cot cabins. Children from ten to twelve years should be housed in eight-cot cabins with their leader. In older age groups, the four-cot cabin is preferred with leaders housed in a separte cabin. An important advantage of the small group is that it provides for the many children who do not easily adjust to larger numbers, and permits more adequate supervision.

Sleeping cabins should be screened against insects. Concrete floors should not be used since they favor dampness. Window openings should be as large as possible consistent with protection against the weather.

The standard spacing between cots is six feet between the side rails of beds and four feet between the end rails. Each individual is entitled to about fifty feet of floor space and 500 cubic feet of air. Double-deck bunks or cots are not desirable because they are more difficult to keep clean and create a safety hazard.

An infirmary or hospital in some form is essential for every camp, but facilities beyond those required for emergencies need not be located in a camp if they are near enough for ordinary needs. Provision should be made for the isolation of contagious cases.

Experience has proven that the optimal camp size for efficient management is that providing for from 96 to 120 campers and their leaders. The camp is best managed when the activities that are common to the entire camp area are concentrated in a central group of buildings. This should include a large central dining hall, a recreation building, an administration unit, quarters for the staff and help, and a central wash-house with showers, and toilet and washing facilities for both sexes.

The quarters for the help should be located close to the dining hall and the central latrine, yet isolated from the camp activity. The help should not mix with the campers and need to be housed separately. The staff quarters should be designed as a place for the camp staff to live. This should be a place where they can gather at night, and will often be constructed so as to be of use in the winter months.

The central dining hall and kitchen is built to care for the entire camp. One-third to one-half of the wall space should be screened. The design of the central dining room is regulated by the spacing of the individuals at table. Each camper is allowed sixteen square feet, and his mates should be seated at tables maintaining a spacing of three feet between each child.

A study of the camping movement will show that it is not advisable to invest in too permanent or expensive construction. It is wiser to develop a long-range program and keep the camp design flexible so that it may easily be changed to meet new conditions. It is best to amortize one's investment and to plan for its replacement at the end of about 25 years.

Whenever human beings appear in the vicinity of the water supply, there is danger of pollution. State health regulations should be carefully followed, and rigid precautions must be taken to insure purity. The careful planner will make a survey of the camp water-shed to be sure neighbors do not pollute the camp area. Wastes should be disposed of away from the water supply or the water front. Adequate sanitary disposal of sewage is a serious problem in camp planning. Failure to recognize the problem at every point in camp construction may result in serious consequences.

All camps must provide for the disposal of kitchen waste and accumulated rubbish. Garbage should be disposed of in an incinerator if it cannot be hauled away, as raw garbage that is buried affords a good chance for pollution. All old cans should be burned, flattened and buried, and liquid kitchen waste may be disposed of by a soakage pit, but a trap must be provided to catch large particles of grease or food.

The physical condition of the camp site and the camp equipment constitutes a major problem. Studies indicate that most injuries occurring in camps can be eliminated by careful planning. Attention should be paid to potential hazards when a camp site is selected and provision should be made for their removal. Insect carriers of disease and poisonous plants should be eradicated, and areas with natural dangers such as cliffs should be avoided. Proper attention to these site factors eliminates about 25 per cent of camp accidents. Surveys have disclosed that injuries arise from three sources on hikes and mountain trips, water accidents, and dangers which have their origin in the use of kerosene, gasoline, and other combustible materials.

Lastly the water front necessitates a program caring for both safety and sanitation. The water front development should meet the requirements of the health authorities as well as the policies laid down by the American Red Cross. The construction of floats and swimming piers, and the state of the bottom of the swimming area all have a relation to health and safety. Such structures should be slip- and splinter-proof. All holes, rocks, and snags should be removed from the bottom of the swimming area. Portable sanitary facilities may need to be placed in close access to the beach, for the prevention of pollution.

PROTECTING THE HEALTH OF CAMPERS

LENDON SNEDEKER, M.D., *Chairman*

Massachusetts Committee on Camps of
The American Academy of Pediatrics

An unobtrusive watch over the health of his campers should be one of the chief duties of the camp director. Health should mean something more to the camp staff than the avoidance of measles, or putting onto Johnny's skinny frame one or two elusive pounds which may be lost at home in the succeeding early months of fall. Most successful camps are quite aware of their health responsibilities.

The overathletically-minded are apt to consider a concern for health as synonymous with a desire to pamper. However, it is possible to be safe and thorough without overemphasis or self-consciousness.

Health regulations and standards often seem unnecessarily fussy. Neither are they apt to be thankfully received, when, as is so often the case, their observance means the spending of sizeable sums of money. However, it should be remembered that such regulations are usually based on sound experience.

All measures taken to protect the health of campers should be based on an intelligent appreciation of the physical and emotional needs of growing children. The camp diet is not always optimal and may need close scrutiny by someone more than superficially conversant with the principles of nutrition. There is often too much starchy food and too little fresh fruit, meat, eggs, and vegetables. Undue emphasis is often placed on purely athletic activities with resulting fatigue and overstimulation. It is only fair to say that in most well-run camps the senior members of the staff are usually well-versed in these matters. Many of them have a daily acquaintance with children during the winter in school or settlement house. However they may easily presuppose that their junior staff members are similarly experienced and fail to oversee the small but important details of camp life. A good counselor must develop both by education and experience an intuitive sense which tells him when his boys have had "enough." Any good mother eventually acquires this faculty, but it takes time and continual association with children.

In the case of children who are physically handicapped, special supervision and restriction of activities are imperative, and no camp should assume responsibility for them unless their needs can adequately be met.

Examination of the child before camp is done both for his protection and for the welfare of his camp-mates. It should be more generally realized that such a procedure is a screening process and not a complete health study. Various types of records may be used. One succinct form containing most of the essential data required is that approved by the Camping Division of the Boston Council of Social Agencies. Sample forms may be obtained on request. The physical examination may include the taking of any measurements desired for estimating the child's physical condition; for example, height, weight, or other bodily measurements; however, the value of such findings is often overemphasized.

One is inclined to question the value of routine laboratory work on prospective campers unless the physical examination and history afford suggestive leads to potentially serious conditions. For example, urinalyses are not necessary unless there is a story of repeated urinary infections or kidney trouble. Routine nose and throat cultures for diphtheria are not worth while, and are very apt to disclose a confusing number of carriers of avirulent diphtheria bacilli. These remarks are not made to discourage the collection of potentially interesting physical data when done with a purpose. However, the rank and file of camps will not want to engage in such surveys. The camp examination should be whittled down to suit specific needs.

The camp staff deserves as much consideration as the children entrusted to it. In addition, individuals engaged in preparing food should at least have stool cultures taken to exclude the possibility of their being typhoid carriers.

The precamp examination should be supplemented during the child's stay at camp by periodic health inspections. In our experience it is not necessary for the camp doctor or nurse to assume full responsibility for this duty. With proper guidance mature counselors are capable of participating in the inspection and the children thus weeded out can then be turned over to the proper camp authorities. Such an inspection is best carried out at the beginning of the day and, if possible, should be a daily procedure. It is not enough to make a hurried inspection of children at the time of the swimming hour.

Each counselor should be expected to supervise the health habits of his children. He should not only be responsible for the maintenance of ordinary standards of cleanliness, but should extend the limits of his curiosity so as to be informed of such fundamentals as bowel habits.

Every camp should at least provide minimum facilities for the care of its sick children. Their completeness will depend on the number of children served, the type of health personnel employed, and the proximity of the camp to a hospital. Whenever possible, it is desirable to have a qualified doctor in residence, especially one who has had some experience with children. Under present conditions this will not often be possible, and the nearest medical practitioner should be retained to make periodic and emergency visits to camp. Opinion is divided as to whether a medical student or graduate nurse makes the best substitute for this resident doctor. In general the nurse should prove more satisfactory. She is more apt to have had experience caring for sick children and is a better mother substitute.

Regardless of the size of the camp, some sort of infirmary should be provided, including facilities for the isolation of any child suspected of having a communicable disease. Under primitive conditions this need be nothing more than a tent segregated from the rest of the camp buildings, but under modern conditions some more adequate type of structure should usually be available. Any camp caring for more than fifty children at a time should be provided with a separate infirmary building. The facilities provided should include a stove, adequate washing facilities, a ward of several beds, an isolation room, a well-equipped dispensary, and quarters for the resident doctor or nurse. With this equipment, it is possible not only to treat minor illnesses requiring bed care, but to pay adequate attention to the child in need of a few days' rest in bed or the one whose cough persists under the conditions of tent or cabin life.

Our experience shows that about one-third of all campers will require some medical care during a two-weeks' stay in camp. Special attention should be paid to supplies needed for the care of the most frequent types of illnss, which are: cuts and bruises, colds, constipation, headache, athlete's foot, abdominal pain, earache, poison ivy, and sunburn.

First-aid facilities should be provided at every camp and when trips away from camp are the rule, each party should have its own first-aid kit in the hands of a responsible trained leader.

It is not enough to treat the disabilities which result in the course of the camp stay. The Camp Director should report to parents any unhealthy conditions affecting their children, and make recommendations for their correction. This includes attention to undesirable character traits or problems of behavior.

Health conditions at many of our Massachusetts camps fall short of adequacy because of a failure to comprehend the responsibility of the camp to the parents who so trustingly hand over their children to the care of strangers. Aside from the need for an awakened conscience, there is a complementary need for the publication and definition of health standards which are possible of attainment by the majority of camping organizations. Such standards should be drawn up jointly by groups of individuals experienced in camping as well as in health. National organizations such as the Boy Scouts of America, the Girl Scouts of America, the Camp Fire Girls, and the American Camping Association have already made important steps in this direction.

OPPORTUNITIES IN NUTRITION FOR CAMPS IN 1941

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This year young people in National Youth Administration camps and army camps, as well as children in summer camps, have an unusual chance, through better meals and other nutritional factors, to gain a higher standard of nutrition. Both directors and children can act practically "to make America strong by making Americans stronger." Healthy, outdoor appetites and good sleeping hours are conducive to trying out and liking new, nourishing dishes. Individual problems always have to be considered, but just eating with the group at regular times would take care of many of these. Camp is a place where nutritional deficiencies that "reduce the level of vitality, lower the living, thinking, working, and enjoying capacities of people" may be corrected.

Ways of Improving Camp Nutrition

A working acquaintance with the principles of nutrition and the eating habits of children should be demanded of the camp staff. In this way, each adult will be effective in improving the nutrition of his campers. Children observe quickly what a favorite counselor does or says about his own food and often adopt a similar attitude. A mere remark on fresh carrot sticks may cause the children at one table to refuse these vegetables, while all others are eating them with relish. When to "kid" a child a bit seriously at the table about his eating habits, when to see him alone, when to insist, and when to ignore eating habits, are all matters for serious discussion. When to praise the cook for a special dish, and when the conversation about food is out of place at the table, are as much matters for consideration as what portions of food to serve and what children should have to eat and what to do about competitions in eating as large quantities of foods as possible. Some preliminary instruction will help in developing a common understanding of this part of the child's camp life.

The buying of food is another real factor in good nutrition. Directors ask how much they should spend per day per person to get the right kinds and amounts of foods. Good or poor results in foods may be afforded by 30, 35, 45, and 65 cents a day. Those camps who have only 30 cents a day to spend must of course buy the more carefully. Vegetable fats with vitamins may take the place of butter for cooking. Evaporated milk and dry milk powder sometimes are substituted for fresh pasteurized milk. The least expensive canned vegetables for the year are in order. Planting a vegetable garden with Swiss chard and lettuce early in the spring may insure the fresh vegetables so often lacking in July. Canned juices—orange, grapefruit, and tomato—may help to give the four ounces of orange or grapefruit or the eight ounces of tomato juice that give the necessary vitamin C each day when fruit is scarce and tomatoes have not yet developed. By many such ways and means, the child and the adult may get their quota of protein, fat, carbohydrate, minerals and vitamins, even at 30 cents a day. The small camp may have to buy the eight-quart can of milk and be unable to take advantage of money saved in the forty-quart can, so the small camp has to have an even better buyer than the large camp. This year camps may be able to buy flour or bread enriched with vitamin B complex, thiamin, riboflavin, and nicotinic acid, or an enriched dark flour which makes a nutlike flavored bread for the same price as the bread of 1940. These vitamins will be a real addition, as they are apt to be lacking in our present day diets. Do your buyers know food costs and specifications, to buy advantageously? Do they buy in "futures"? Quantity buying is always dependent on the refrigeration provided. The food buyer cares for one of the most expensive items at camp and for that reason should be carefully chosen.

Careful cooking and the use of standardized, nourishing recipes help prevent food waste. Cereals, for instance, with this care will be smooth, have a uniform consistency and be perfectly seasoned, so children will like them. Vegetable cookery is of especial importance, so that vitamins and minerals will be retained. Cook foods as quickly as possible. Use small amounts of water and put what is left in soups. Steaming is a good way to cook vegetables. Do not peel vegetables or fruit; cut them up and let them stand before cooking. Cooking them whole and with the outer covering on helps preserve the vitamin content. Never add soda to vegetables during cooking. It destroys vitamins B and C.

Cook green vegetables in an open kettle and they will stay green. Serve the foods as soon as possible after they are cooked. Canned vegetables should be heated, not cooked a long time, to conserve the vitamins. If fresh fruits and vegetables are chopped and crushed and then allowed to stand, they lose vitamin C rapidly. A good recipe for boiled dressing, instead of so much mayonnaise, will save money and the health of some of the younger children who cannot assimilate so much fat. The cook must be expected to prepare not only what tastes good and looks appetizing, but what is of real nutritive value.

Menu planning and attractive service are essential aids to good nutrition. Each day look and see that your attractive plans measure up to the day's requirements of your group—that is, check for essential foods. It is not necessary to figure out grams and calories of proteins, fats, carbohydrates, minerals and vitamins each day. Variety, flexibility and imagination make for welcome menus. A picnic does not necessarily mean sandwiches or hot dogs. Even if these are served at a picnic, a thermos jar, or a pail wrapped in newspaper containing cool tomatoes or cole slaw add refreshment and color to the sandwich load. Molasses milk shake makes a change and adds extra iron. Camp suppers need not be too light. If a picnic lunch has been eaten at noon on the top of a mountain and the campers get back in time to rest before the evening meal, the dietitian can serve hot meat and vegetables for a real dinner to make up for what was missing at the noon meal. If it is a hot day, an egg salad with crisp greens makes a good main dish for supper, whereas if it is chilly and wet, a cheese fondue and beet greens would be more acceptable. The evening meal must be easy to digest but there should be plenty of it to make for a peaceful night for all. Combinations giving contrast of color, flavor and texture add zest to meals at camp, as at home.

Let's give the children a chance to participate. They will help with ideas and learn to like this part of camp life better if they have a chance to share in it. If you set the table and prepare for the outdoor picnic, the healthy ones will usually accept happily what is provided. A few, however, will be dissatisfied. A part by the children in the planning of the meals for picnics, for outdoor cookery, for the Sunday night supper, is a very natural way of learning the why and whats of a balanced meal and its preparation. It's fun—even to reckon its cost may be fun. The child in the small group has more of a chance to have a hand in planning and cooking than the child in the large group. For this reason, camps are having more small picnic fires than the large fire for the whole group. Foraging for berries, bringing in fish, and helping the farmer with the picking of vegetables may bring joy to the provided. It may be harder for the counselors and dietitians, but will bring results to the children in learning to like certain foods. Dr. Lydia Roberts says "Boys and girls should know enough so they may choose intelligently wherever they go—school, home, restaurant or South Pole." Camps may offer such ways of living to boys and girls that the individual boy or girl, learning to choose wisely, may do better thereafter what he does well at camp.

Preventing overfatigue from too strenuous swimming, mountain climbing or hiking means improvement in child nutrition. Tired truckloads of children must get a rest before a meal. Careful planning of camp days helps tremendously. However, individual children must be kept under careful supervision so that they will not be too tired at mealtime.

They, too, may learn this simple health aid at camp.

Adequate toilet facilities help prevent many cases of constipation in camp. Some children do not bother with this part of the routine if they are retiring and do not like to assert their rights. Some dress slowly, and to be on time for breakfast, hurry at the toilet. Of course, this makes for poor appetities and other troubles. The counselor in charge needs to look out for the individual here.

SUMMARY

Camps have found that a trained dietitian who knows food cost control, good cooking for health, and child nutrition, makes a wise investment for a successful camp.

The understanding by each member of the camp staff of the importance to the individual child of good nutrition and of ways of helping him to achieve it—is a great opportunity for better nutrition.

With the help of the staff each child can learn what he can do to improve his nutrition as a part of camp life. If he finds out this is of significance to him personally, he will work for his own betterment.

The Massachusetts Department of Public Health has the following free material for people in the State:

Summer Camp Menus (for one week)—for the dietitian
Sandwiches
As a Change from Sandwiches
Cookies for Children
Outdoor Cooking for Health
Food for the Teens
Self-Check on Personal Appearance
Food for the School Child
Keeping Well—gives an opportunity for the child to keep track of his own progress in learning to like new foods.
Good Eating Habits
Aids to Bowel Movement
Sanitation Score Card—to be checked by directors, dietitians, cooks or childern.
Food Cost Control Sheet
The Character and Cost of Organized Camping

CONTROL OF COMMUNICABLE DISEASE IN CAMPS

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Massachusetts Department of Public Health

A. Measures to be taken before camp opens.

1. Establish a useful record system.
    a. *List in duplicate the name, age, address, and dates of expected arrival and departure of campers, employees, and staff.* Such a list is essential for the routine administration of the camp. A duplicate list will save invaluable time should notification or epidemiology be required when a case of communicable disease occurs.
    b. *Have available for each camper a definite history of past illness with the common diseases of childhood.* With the occurrence of a case of communicable disease, control measures to be taken will depend largely upon such histories. Where the

camper or his family is uncertain about previous infection it should be so noted.

2. Require campers to be immune to certain diseases.
   a. *Diphtheria.* The occurrence of one case of diphtheria can disrupt the entire camp. Routine nose and throat cultures for diphtheria give a false sense of security and should be discouraged. All campers under fifteen should have a Schick test done before going to camp and furnish the Camp Director with a statement of the result. The camp should require that all positive reactors receive a full course (three injections) of toxoid or toxin-antitoxin before going to camp. Material for such immunization is available free of charge to the physicians of Massachusetts.
   b. *Smallpox.* Camp Directors should insist that every individual entering the camp should show evidence of successful vaccination by a good and sufficient scar, or a certificate of the immunity reaction, or a certificate of exemption signed by a registered physician.
   c. *Typhoid.* If it is felt that campers cannot be relied upon to drink water of known purity, they should be urged to take typhoid vaccine before going to camp.
3. Obtain specimens from food handlers to prevent employment of a typhoid carrier.

   A Widal (blood test) and a stool and urine culture should be obtained from each of the kitchen workers. Those who wait on table should not have these tests done unless they are over thirty yars of age or give a history of previous typhoid fever. Arrangements for these tests must be made with a physician. Outfits for these tests and the examination of specimens are provided free of charge by the Massachusetts Department of Public Health.
4. Make sure that camper has not been exposed to or is not suffering from a communicable disease.

   Shortly before leaving for camp, all campers should be questioned relative to illness in themselves or members of their families. If such a history is obtained, a physician should be consulted. In case of exposure to a communicable disease, the Massachusetts Department of Public Health may be called upon for advice. Infections such as pediculosis, scabies, impetigo, and pinkeye, although not reportable to official agencies, are communicable and persons with such infections should be cured before entering camp.
5. Arrange for medical care at camp.
   a. *Physicians.* In camps where there is no resident physician, arrangements should be made with at least two neighboring physicians to supply professional service when needed. One physician should always be available for service.
   b. *Isolation quarters.* Depending upon the size of the camp, two or more beds should be available in separate quarters in which isolation technique may be carried out for persons suspected of being ill with a communicable disease.
6. Arrange for a safe milk supply.

   Milk which is so essential in all diets, has been responsible for many serious outbreaks of communicable diseases. All such outbreaks of milk-borne disease have been traced to unpasteurized milk. The Camp Director who does not wish to gamble with the health of the campers must insist upon a pasteurized milk supply.

7. Make sanitary survey of the camp.
   a. *Water and sewage.* Examination of water supply and sewage disposal will routinely follow upon application to the local board of health for the required license to conduct the camp. (See section on Sanitation.)
   b. *Rodents.* Rat-proofing of the place in which food is to be stored will prevent not only loss of food but also contamination of food by disease-causing organisms excreted by rodents.
   c. *Insects.* The Director of a camp situated in a tick-infested area must appreciate that these insects not only are a nuisance but may at times spread a serious illness, namely Rocky Mountain spotted fever. The area immediately surrounding the camp may be made relatively free of ticks if brush, grass, and weeds are cut close to the ground, or if spray solutions are used. Literature on the control of the tick may be obtained from the U. S. Department of Agriculture, Bureau of Entomology and Plant Quarantine, Washington, D. C.

      It is extremely rare for the mosquitoes of Massachusetts to transmit disease to humans. Where their numbers are sufficient to make them a serious nuisance, screening and control measures should be undertaken.
8. Inform campers' families as to policy on visitors.

   Visiting should be limited so far as practicable. This applies particularly to visiting children, who are more likely to bring in infection.

B. Measures to be taken after camp opens.

1. Look for illness in new arrivals.

   During the two weeks immediately following the opening of the camp, observation of every individual is particularly important and everyone should have his temperature taken once daily. Later arrivals should be subjected to the above observations for two weeks after entering camp.
2. Isolate sick campers until assured they are not suffering from a communicable disease.

   Children who appear to be ill and those showing a significant rise in temperature (99°-100°F.) should immediately be isolated and kept in isolation until it has been definitely determined that they are free from communicable disease.
3. Observe technique of kitchen workers.

   From time to time food handlers should be observed to see that they handle food in a sanitary manner. Attention should be given to adequate refrigeration and to the covering of foods left over from the previous meal. Food handlers should be impressed with the importance of adequate washing of hands with soap and water after coming from toilet, and the wisdom of prompt reporting of diarrhea or vomiting.
4. Educate campers on hazards to health.
   a. *Drinking water from source of unknown purity.* Whether or not campers have been inoculated against typhoid, they must be impressed with the dangers of drinking water of unknown

purity. The fact that other persons are seen to drink water at a roadside spring is in no way a guarantee of its purity.

b. *Pollution of water by campers.* Campers must be impressed with the need of using the toilet facilities of the camp when they have to go to the toilet. They must understand that otherwise their excreta may pollute the water supply of the camp or its neighbors.

c. *Failure to wash hands after toilet.* This general hygienic principle is of particular importance where campers handle food for the consumption of others.

d. *Tick bite.* Camps located in tick-infested areas should instruct campers in the proper examination of the body and its clothing for ticks, and in the methods for their removal. A pamphlet issued by the Massachusetts Department of Public Health is available for this purpose.

e. *Dog bite.* Although animal rabies in Massachusetts is comparatively rare, every case of dog bite must be considered as a potential source of rabies. If the camper is unable to identify the animal which bit him or learn the name of the owner, fourteen or twenty-one injections of antirabic vaccine may have to be given. Further literature on this subject may be obtained from the Massachusetts Department of Public Health.

f. *Snake bite.* Although this is not a communicable disease, occasional inquiries are made of this Department concerning such bites. There are only two species of poisonous snakes in Massachusetts. A description of these and the more common nonpoisonous snakes in this State may be found in a pamphlet which may be purchased at small cost from the Museum of Natural History, 234 Berkeley Street, Boston, Mass.

C. Procedure to follow when a reportable disease occurs in camp.

1. Measures required of the physician.

   The physician is required by law to report to the local board of health all diseases dangerous to the public health.

2. Measures required of the camp authorities.

   No case or suspected case of communicable disease or contact therewith should be allowed to proceed to his home without permission from the local board of health concerned. (This is a statutory requirement in Massachusetts.) It is suggested that, in the case of contacts, the local board of health of the city or town to which the suspect is going be notified of his name and address and the disease to which he may have been exposed.

TUBERCULOSIS CAMPS

ARTHUR J. STRAWSON, *Executive Secretary*
Massachusetts Tuberculosis League

The early work of voluntary tuberculosis associations frequently included the setting up of sanatoria, of clinics, and of public health nursing services in addition to their basic health education programs. Camps for tuberculosis patients, both adults and children, were also provided in the early days. Those for adults were abandoned with the development of city, county, state and Federal sanatoria.

By 1941, many private sanatoria, particularly in the Southwest, have ceased to exist. Their beds have more than been replaced by the provision of beds in public sanatoria. These beds have, on the whole, become increasingly effective, so that there is a constantly diminishing need for private sanatoria. A few such sanatoria, however, have a place and will be wanted as long as tuberculosis exists.

Unlike the other agencies mentioned, health camps for children were not often taken over by official agencies. Their early work on tuberculosis prevention was experimental. It is to be recognized that in experiments and in research all methods will not prove equally valuable, and that those found to be less helpful are not further developed. Resistance built up in the two months these children are treated has been proven in some cases to be inadequate to prevent the development of the disease during the crucial years of life. In the past few years, many camps started by tuberculosis associations have been discontinued in favor of case finding, rehabilitation, health education, and other activities. This trend is likely to continue, and so camps may become available for care of children who are not tuberculosis contacts if other agencies are interested in their support.

However, six of the seventeen voluntary health camps of the Massachusetts tuberculosis associations have been moved onto the grounds of cooperative tuberculosis sanatoria. These sanatoria and most tuberculosis associations uphold the suggestions with respect to the selection of health campers along the lines approved by the Massachusetts Tuberculosis League, as follows:

> It is suggested that preference be given to children according to the following classification:
>
> (1) Children, with known exposure to tuberculosis, positive to tuberculin, with X-ray evidence of primary tuberculosis and 10 to 17 years of age.
>
> As there are more girls than boys with tuberculosis at this age, it is desirable to take more girls than boys. Only those with inactive (calcified or fibrotic) lesions are suitable for admission to summer health camps. Children with pulmonary lesions or with active tracheo-bronchial glandular tuberculosis are in need of sanatorium care or its equivalent and should not be admitted to summer health camps.
>
> (2) Children exposed to the disease and positive to tuberculin but with negative X-ray findings.
>
> (3) Children with or without known exposure to tuberculosis, positive to tuberculin, and suspected of primary tuberculosis from X-ray findings.
>
> (4) Children positive to tuberculin who have definite malnutrition.
>
> Children who have physical defects, such as tonsils and adenoids which should be removed, carious teeth needing care, etc., should have these conditions corrected before admission to the camps.
>
> Opportunity should be taken to have an X-ray examination of all family contacts of tuberculous children admitted to the camps.

A characteristic feature of these camps is the greater amount of rest provided as compared with most other camps and with the homes of the campers.

Tuberculosis associations point out that these boys and girls of most impressionable years are taught better food habits. Other good living habits are also taught. In most camps Sunday afternoons are used for health education of parents and campers. Some use but one such afternoon while others use more. One camp so uses many Sunday afternoons. Most camps welcome assistance of the Nutritional Advisory Service of the Massachusetts State Department of Public Health.

New health camps for tuberculosis prevention are no longer advocated. It is, however, most desirable that those being operated should select their children wisely, that the health education work in camps should be well done, and that, after discharge, the camper's family should have adequate medical and nursing follow-up.

CAMPS FOR DIABETIC CHILDREN

Priscilla White, M.D.
The New England Deaconess Hospital, Boston

The summer camp diabetic unit is an important adjunct in the treatment of juvenile diabetes. The reasons are many, perhaps obvious. Camp not only supplements hospital training and education, but in a diabetic clinic such as our own where adults predominate, it affords a unique opportunity for necessarily specialized training. The contact with another child who has the same handicap helps increase the patient's morale. The camps, too, provide a relatively safe vacation where the hazards of diet-breaking, errors in insulin administration, and participation in dangerous sports may be minimized. For the parents, vacations and relief from 24-hour worry are afforded. Advances in the treatment of diabetes are possible when large numbers of these patients may be studied together at one time. Special long-time investigations involving growth and development may be carried on. Not the least advantage is the economic one. The actual cost per week for each camper varies from $12 to $15.

Five camp units have been established in New England. The largest and most attractive is the one for girls at the Clara Barton Homestead in North Oxford, Mass. The medical personnel consists of three nurses specally trained in diabetes, two laboratory technicians, and a dietitian. There is no resident doctor. The camp personnel consists of a trained director, hostess, a sports director, and assistant counselors. The buildings consist of a barn playroom, an administration building with dining room, kitchen, and sleeping quarters for staff; four sleeping cabins for the campers; a scrub parlor and an isolation cabin. Quantitative urinary sugars are done on the 24-hour specimens of urine daily. Once a week blood sugars are done before breakfast, before lunch, and before the evening meal. Diets are weighed and charts are kept exactly as if the patient were hospitalized. Sports activities consist of swimming or organized games; crafts are popular and dramatics featured.

A similar unit for boys under 12 is run at the Prendergast Preventorium in Mattapan. In fact, this unit runs the year round and another unit for boys over 12 has been established at Hawthorne Lodge at Winthrop.

Donations are voluntary. The Women's Missionary Association of the Universalist Church owns the Clara Barton Camp property and pays one-third of the running expense. The children donate one-third and the remaining third is derived from funds available from gifts to Dr. Joslin. The Unitarian Alliance gives generous support to the units at Prendergast and Winthrop. The remainder is derived from the children and funds for study and care of diabetics.

Two units of 10 diabetic children supervised by well-trained nurses are sent to private camps, one for boys in New Hampshire and one for girls in Vermont. A small fee for the diabetic care is charged in addition to the usual camp tuition. We can provide vacations for 400 children at these five different units. In Massachusetts there are about 1,050,000 children under 15 years of age, and since one out of every 2,500 of these contracts diabetes, our state has 420 juvenile diabetics and on this basis the present facilities are numerically adequate.

CAMPS FOR CHILDREN WITH SPECIAL PROBLEMS

Kenneth I. Wollan
Boston Juvenile Court

Only infrequently have summer camps concerned themselves with the care of children with special problems. The usual camp program is set up to meet the needs of the rugged, healthy, outdoor, well-adjusted boy or girl. The recreational interest which has been the predominant emphasis has not concerned itself wholeheartedly with the therapeutic or educational possibilities of camp life.

Needed today among the resources of any large city are camps for two kinds of children; first, for those children with such disabilities as diabetes, epilepsy, rheumatic fever, and physical handicaps; and secondly, for children with such behavior deviations as would make their adjustment in the usual type of camp improbable.

It is not infrequent to see a boy who has responded successfully to a program of treatment for epilepsy who has suffered permanent personality damage due not to his disease, but to the protective, restricted life imposed upon him by his disease. Medical problems of this type need the normal socializing life that is possible under camp conditions to insure wholesome personality growth while the disease is being treated.

Any realistic venture into this field of camping must take into account several things:

1. *Expense.* The per capita cost of this type of camp is going to be high. The actual physical equipment need not be fancy or expensive, but individual care costs money, demands larger staffs, careful follow-up, and facilities for giving each person special attention.

2. *Staff.* The staff will include not merely a craft teacher from a local college, and an activities man from a group work center, but will, of necessity, demand trained medical and psychological service in addition. Sick boys and girls should not be confronted with a camp staff of specialists, for they need to live and play with persons who look at life from a healthy, normal point of view, but the specialist must be on hand to give service when needed.

3. *Program.* The program must be varied and less competitive than that found in the ordinary camp. The activity must not rely too heavily on vigorous athletics or strenuous campcraft. With certain types of children such a program may be possible but there must be, however, a wide range of available alternatives for those who do not choose this kind of activity or cannot profit by it.

4. *Follow-Up.* The camp experience for many children with special disabilities is but one phase of a continuous program of treatment. It has been found advisable in some instances to divert a certain number of clinic staff members during the summer months to keep the continuity in the treatment program, both to crystalize clinic efforts

already made, or to capitalize on the summer experience for subsequent efforts.

The task of providing this type of service for a community should be one of the chief ventures of those dealing with children's problems allied with medicine, education, and social work. It promises to be difficult to finance and to administer but it also promises to provide circumstances for normal development for a large number of children who need a wholesome social atmosphere in which to conquer disease and to grow to healthful adulthood.

THE MANAGEMENT OF CARDIAC CHILDREN AT SUMMER CAMPS

John P. Hubbard, M.D.
The Children's Hospital, Boston

The so-called "cardiac child" is one who has heart damage usually resulting from rheumatic fever or from a congenital malformation of the heart. There are other causes of heart disease in children but these are rare and do not require discussion here.

Rheumatic Fever and Rheumatic Heart Disease

Rheumatic fever is a disease which is prevalent among children, particularly those of the poorer classes. Because of the frequency with which it attacks the heart, it is a very serious disease, often fatal or causing permanent and crippling damage. During the period of active infection, which may extend over many months or even years, the child should be confined to bed, and hence would not be a candidate for camp. The rheumatic child allowed to attend camp would be one who is convalescing from the active infection, or one who, because of rheumatic fever in the past, either with or without resulting heart damage, deserves careful supervision.

The management of the convalescent child will, of course, depend on how recently he has been allowed out of bed. After recovering from the active infection there usually follows a period of about two months during which he is on a schedule of gradually increasing activity. At this time, if there have been no setbacks, and if there is no evidence of heart disease, the child may be allowed a full, unrestricted regime.

If there has been cardiac damage, the child may have to be restricted, but not necessarily. There are many children with heart murmurs resulting from rheumatic fever, whose hearts are normal in size with good function. Usually such children can and should lead normal lives. Furthermore, and of great importance, they should be made to think of themselves as normal, healthy children. Too often a child is allowed to be placed on the invalid list with no justification.

If the heart has been severely damaged, enlarged, and functioning poorly, the child will have to be restricted in proportion to the amount of the damage. Medical guidance is needed for this group but a safe rule to follow is that a child may be allowed activity up to the point of causing breathlessness or fatigue. Competitive athletics which may cause undue exertion for these children should not be allowed. Swimming may be permitted so long as the child does not go beyond his depth where he may have to tire himself to get back.

Anyone in charge of rheumatic children should be continually aware of the fact that rheumatic infection may recur following a cold or sore throat. Therefore these illnesses should not be treated lightly.

The child should remain in bed until all symptoms have subsided, and for at least a month he should be carefully watched for any evidence of rheumatic fever.

Chorea, often called St. Vitus' Dance, may also be a manifestation of rheumatic fever. A child, so afflicted, has jerky, uncontrollable movements of arms, hands, face, etc. If the chorea is marked, the child will drop objects, be unable to manage eating utensils, and grimace unnaturally. Since this may follow emotional excitement or nervous fatigue, it should be kept prominently in mind by those in charge of camp children who are inevitably exposed to emotional excitement. Any suggestive symptoms should have prompt medical attention.

Congenital Heart Disease

A child may be born with a malformed heart, and have as a result little or severe impairment of cardiac function. The milder types of congenital heart disease may be detectable only by careful medical examination and may be of no consequence to the child. The more severe types may be very apparent, with cyanosis (blueness) of lips, fingernails, etc. They may cause breathlessness on slight exertion, and even limit normal growth and muscular development.

In regard to guiding the child's activities, what has been said of rheumatic heart disease is in general true of congenital heart disease. The child should not be allowed any exertion which produces breathlessness or fatigue. The psychological management is also important, emphasis being placed on health rather than handicap, and the child being allowed, in so far as is possible, to forget his malady and take his place as a normal member of the group.

LAWS PERTAINING TO CAMPING IN MASSACHUSETTS

Until 1939 there was no regulation requiring the licensing of camps in Massachusetts. The exact number of camps in the State was not even known. In that year an act was passed, requiring licensing and making it mandatory for local boards of health to make periodic inspections of camp premises.

Chapter 416 of the Acts of 1939 reads as follows:

AN ACT REQUIRING THE LICENSING OF RECREATIONAL CAMPS, OVERNIGHT CAMPS OR CABINS AND TRAILER CAMPS.

Be it enacted, etc., as follows:

Chapter one hundred and forty of the General Laws is hereby amended by inserting after section thirty-two, as appearing in the Tercentenary Edition, the following five new sections, under the caption RECREATIONAL CAMPS, OVERNIGHT CAMPS OR CABINS AND TRAILER CAMPS:— *Section* 32A. No person shall conduct, control, manage or operate, directly or indirectly, any recreational camp, overnight camp or cabin or trailer camp unless he is the holder of a license granted under the following section.

Section 32B. The board of health of any city or town, in each instance after notice and a hearing, may grant, and may suspend or revoke, licenses for recreational camps, overnight camps or cabins or trailer camps located within such city or town, which license, unless previously suspended or revoked, shall expire on December thirty-first in the year of issue. The fee for such license shall be fifty cents. Such board of health shall at once notify the state department of public health of the granting of such a license, and said department shall have jurisdiction to inspect the premises so licensed to determine that the sources of water supply and the works for the disposition of the sewage of such premises are sanitary. If upon inspection of such premises said department finds the sources of water supply to be polluted or the works for the disposition of the sewage to be insanitary, or both of such conditions, said department shall forthwith notify such board of health to that effect by registered mail and said board shall forthwith prevent the use of any water supply found by said department to be polluted. Unless such licensee shall, within thirty days following the giving of such notice, correct the conditions at such premises to the satisfaction of both said department and such board the license so granted shall be suspended or revoked by such board. Any license so suspended may be reinstated by such board when the conditions at such premises, as to sources of water supply and works for the disposition of sewage, are satisfactory to said department and such board. The board of health of a city or town may adopt, and from time to time alter or amend, rules and regulations to enforce this section in such city or town.

Section 32C. Every board of health shall from time to time examine all camps and cabins licensed by it under authority of section thirty-two B, and if, upon such examination, such camp or cabin is found to be in an unsanitary condition, said board of health may, after notice and a hearing, suspend or revoke the license.

Section 32D. Whoever conducts, controls, manages or operates any camp or cabin licensed under section thirty-two B shall post in a conspicuous place near the entrance to every such camp or cabin a copy of the rules and regulations adopted thereunder, as most recently altered or amended.

Section 32E. Whoever conducts, controls, manages or operates any camp or cabin subject to sections thirty-two A to thirty-two C, inclusive, which is not licensed under section thirty-two B, shall be punished by a fine of not less than ten nor more than one hundred dollars.

Approved August 3, 1939.

THE ROLE OF JUVENILE CAMPS IN NATIONAL DEFENSE

WALTER E. CAMPBELL, A.I.A.

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Organized public and private camps are unusually well-equipped to participate in the national civilian defense program. Most camps are located in regions remote from densely populated and industrial areas, but easily accessible by roads or trains. This would make the camps natural havens in the event that populations would have to be evacuated from nearby centers of population. The modern group camp, made up of many self-contained units, would permit families to remain united. This is of extreme importance in the maintenance of good morale.

By definition, a well-developed and operated camp is capable of caring for the health, safety and welfare of the greatest number of people for the minimum cost. Directors and staffs are experts in matters

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Editor's note: Mr. Campbell is writing as a private citizen and not in his capacity of an officer of the State Defense Committee.

of discipline, dietetics, physical training, and recreation. All of these qualities, so necessary for the supervision of people who might be concerned in a remotely possible evacuation period, are equally necessary in those who can instruct in matters of civilian defense during the present period of preparation.

A program of defense education and training for which camps are suited would follow closely the normal activity of organized camp life and could easily be incorporated in it without upsetting accepted purposes and routines

In England it has been found that lack of experience with outdoor life is a serious handicap to many physically healthy people in adapting themselves to the abnormal and exposed living conditions so many are experiencing in that country. Camp life gives valuable training in adaptation to primitive living conditions, self-reliance, cooperative effort, physical development, hygiene, and many other qualities needed by the individual who is faced with war or other disasters.

Because of limited space, this article can merely touch on a few subjects which should be included in a camp educational program for defense. These would include training in fire protection, first aid, hygiene, sanitation, cooking, and physical education.

Defense education should also include the teaching of democratic ideals as a background for patriotism and as a means of strengthening the morale of the people.

A new need for camp facilities may develop from the expansion of the industrial defense program. This necessitates the rapid shifting of workers to many regions where there are inadequate housing facilities; and families are naturally reluctant to move to such locations. If parents could send their children to adequate camps, the result would be of obvious help to the cause of national defense.

Certain physical aspects of the average camp may be criticized from the standpoint of the facilities it affords for practical training in defense and for refugee purposes. Few camps are set up for year-round usage. For civilian defense training, this is immaterial unless the normal camp period should have to be extended into cold weather. For purposes of housing refugees, most camps would have to be altered for winter use. This would not be too difficult, as main camp units such as dining halls, kitchens, recreation buildings, infirmaries and staff quarters are usually permanent structures, and could be heated and have protected plumbing systems installed.

If participation in the defense program is contemplated by camp agencies, it is essential to map out a comprehensive program for organized camps in the light of defense needs and possible use during war time.

Another reason for establishing the place of camps in the defense program, is to keep trained personnel together. England again can be used as an example of learning the hard way. In the early days of the war, the most able people were enrolled in active duty before it was recognized that modern war put whole populations and countries in the front line. As a result, it has been found difficult to staff properly these much needed new types of defense units, and it is extremely difficult to secure the release of effectives from active military service no matter how great the emergency. The problem of camp personnel is acute because the very qualities of leadership, necessary in camp directors and staffs, are those most needed in the Army and Navy.

A BIBLIOGRAPHY ON CAMPING

The literature on the camping movement in the United States has now reached very impressive proportions. References are, however, apt to be scattered in view of the fact that so many fields of interest and endeavor are concerned with the child. This is apt to make it difficult for many interested individuals to know what are really significant writings on various phases of camping. The following list of books and monographs is not meant to be inclusive, but offers a few references in a number of the camping fields or in spheres of knowledge related to camping. For convenience and clarity they are arranged by general subject.

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The chapter and sectional headings are in short, nontechnical phrases which will undoubtedly intrigue the individual, turning casually through its pages, to read further.

The author has taken full advantage of the advice and assistance of a number of well informed workers in this field, so that the information contained in the volume is both readable and authentic.

News Note

Annual Meeting of the American Public Health Association

The Executive Board of the American Public Health Association announces the dates of the 70th Annual Meeting as October 14 to 17, 1941. The meeting place is Atlantic City, New Jersey. Headquarters for the meeting will be the Convention Hall. Residence headquarters will be the Hotel Traymore.

The 69th Annual Meeting held in Detroit in October attracted an attendance of more than 3,100 from all parts of the United States and also from Canada, Cuba, and Mexico. The 70th Annual Meeting, it is expected, will bring together more than 3,500 professional public health workers.

A New Jersey Committee responsible for entertainment, inspection trips and other local aspects of the meeting is being formed under the direction of Dr. S. L. Salasin, Health Officer of Atlantic City.

A number of related organizations habitually meet with the American Public Health Association. They will do so again at Atlantic City. Among them are the American School Health Association, the International Society of Medical Health Officers, the Association of Women in Public Health, the Conference of State Sanitary Engineers, the Conference of Municipal Public Health Engineers, and the Conference of State Provincial Public Health Laboratory Directors.

REPORT OF DIVISION OF FOOD AND DRUGS

(As required by General Laws, Chapter 111, Section 25.)

During the months of September, October, November and December, 1940, samples were collected in 268 cities and towns.

There were 1,157 samples of milk examined, of which 73 were below standard, from 1 sample the cream had been in part removed, and 4 samples contained added water. There were 1,892 bacteriological examinations made of milk, 1,798 of which complied with the requirements. There were 4 bacteriological examinations made of chocolate milk, 1 bacteriological examination of food, and 2 bacteriological examinations of rinse water samples, all of which complied with the requirements. There were 78 bacteriological examinations made of cream, 15 of which did not comply with the requirements; 230 bacteriological examinations of ice cream, 27 of which did not comply with the requirements; 1 bacteriological examination of an empty bottle which did not comply with the requirements; and 47 bacteriological examinations of mattress fillings, 6 of which did not comply with the requirements.

There were 693 samples of food examined, 145 of which were adulterated. These consisted of 3 samples of butter, 2 of which were below the legal standard in milk fat, and 1 sample was rancid; 3 samples of clams which contained added water, the containers of 2 samples being misbranded; 1 sample of horse-radish which contained beet juice and coal tar dye; 1 sample of brine for curing corned beef which was a solution containing an aluminum salt; 36 samples of olive oil, 3 of which contained corn oil, 33 contained cottonseed oil and 3 of these samples also contained corn oil; 20 samples of hamburg steak, 9 of which were decomposed, 11 samples contained a compound of sulphur dioxide not so labeled and 2 of these samples were also decomposed; 46 samples of sausage, 42 of which were decomposed, 2 contained a compound of sulphur dioxide not so labeled, and 2 samples contained in excess of 2 per cent cereal and vegetable flour; 3 samples of lamb patties which were decomposed; 2 samples of cider which contained sodium benzoate not so labeled; 4 samples of vinegar, 1 of which contained less than 4.00% acetic acid, and 3 samples had been diluted and were not so labeled; and 26 samples of bedding and upholstering materials, 8 of which were samples of feathers and down which did not contain the materials as specified, and 18 samples of plant and animal fibers which did not contain the materials as specified.

There were 22 samples of drugs examined, of which 4 were adulterated. These consisted of 1 sample of citrate of magnesia which contained sulphate, 1 sample of sweet oil, 1 sample of carbolic acid, and 1 sample of sweet spirits of nitre, all of which did not conform to the requirements of the U. S. Pharmacopoeia.

The police departments submitted 90 samples of liquor for examination. The police departments also submitted 17 samples to be analyzed for poison or drugs, consisting of 2 samples of gum which were found to be gum opium; 2 samples of white powder, 1 of which contained heroin, and 1 sample was examined for narcotics with negative results; 1 sample of light buff powder was found to be heroin hydrochloride; 1 sample of white crystals was found to be cocain hydrochloride; 1 sample was found to contain morphine, and 4 samples were found to contain opium; 1 sample of rinsings from a medicine dropper contained morphine; 1 sample of brown paste contained opium; 1 sample of cigarettes contained cannabis; and 1 sample of cotton, and 2 other samples, were examined with negative results. One sample of meat submitted by the Department of Conservation was examined for heavy metals, barium salts, cyanide, and strychnine, with negative results.

There were inspected 358 plants operated for the pasteurization of milk; 206 restaurants; 74 soft drink plants; 216 bakeries; 106 ice cream establishments; 16 dairies; 1 sausage plant; and 435 mattress establishments.

There were 117 hearings held pertaining to violations of the laws.

There were 83 convictions pertaining to violations of the laws, $3,030 in fines being imposed.

Manuel Furtado of Fall River; Ralph N. Marsh of Athol; Richard C. Phillips of Orange; Raymond Dempsey of Fitchburg; Frank Houghton of Saxonville; Thomas McCarthy of Winchendon, and Frank Dolinski of Westfield, were convicted for violations of the pasteurization laws and regulations.

Isadore W. Stavis, 2 cases, of Chelsea; Economy Grocery Stores Corporation, 5 cases, United Meats, Incorporated, Growers Outlet, Incorporated, Richard Omer, Wholesale Grocery Company, Incorporated, John Wagner, Jack Paperno, Saul Magidson, and Michael De Nucci, 3 cases, of Springfield; Granitone Market, Incorporated, 2 cases, Joseph Matazzaro, 2 cases, Louis Matazzaro, 2 cases, Harry Richstein, and The Great Atlantic & Pacific Tea Company, of Quincy; Arthur Venies of Amesbury; Neighborhood Stores, Incorporated, of Athol; The Massachusetts Mohican Company, and David Cooper of Salem; Morris Sawyer of Taunton; Joseph Basile of Watertown; Louis Biganzoli, 2 cases, of Medford; Colonial Super Market, Incorporated, and Onofrio De Losa of Waltham; Edward Bloom of Newburyport; Joe Friedman and Joe Rodney of Roxbury; New England Markets, Incorporated, and Economy Grocery Stores Corporation, of Cambridge; Donald W. Smith, 2 cases, of Newton; Isadore Jack Miller, 2 cases, First National Stores, Incorporated, and Union Foodland, Incorporated, of New Bedford; Evelina Razzaboni of Somerville; Antonio La Flatta of North Attleboro; Nathalie Chagnon and John Obertuck of Gilbertville; Stanley Bonkowski of Westfield; Francis Quink of Belchertown; August Lavelli of Southwick; James Stevens, James Tiberri, and Central Meat and Grocery Company, Incorporated, of Southbridge; Kelsey's Market, Incorporated of Great Barrington; Economy Grocery Stores Corporation, 2 cases, and Elzear Lussier of Fall River; Aime Grenier of Huntington; Alfred B. Bradley of Deerfield; Matthew J. Gula and Joseph Rajewski of Easthampton; John Dzialo of Southampton; Michael Gaglione of Cranston, R. I.; and Vincent Grande of Providence, R. I., were all convicted for violations of the food laws. Godiace Lussier of Fall River was placed on probation until April 30, 1941. Harry Richstein of Quincy; Joseph Basile of Watertown; Edward Bloom of Newburyport; Joe Friedman of Roxbury; Isadore Jack Miller, 2 cases, and Union Foodland, Incorporated, of New Bedford, all appealed their cases.

Angela Rutuccia of Dorchester; and Beverly Farm Ice Cream Company, Incorporated, of Boston were convicted for violations of the ice cream laws and regulations.

Comfort Pillow & Feather Company of Somerville; Reliable Upholstering Corporation and Moller's Incorporated, of Cambridge; Gilchrist Company and Jordan Marsh Company of Boston; Pilgrim Upholstering Company of Hyde Park; and Columbia Feather Company of Chicago, Illinois, were convicted for violations of the mattress laws.

In accordance with Section 25, Chapter 111 of the General Laws, the following is the list of articles of adulterated food collected in original packages from manufacturers, wholesalers, or producers:

One sample of butter which was rancid was obtained from Isadore Jack Miller of New Bedford.

One sample of clams which contained added water was obtained from Ipswich Shellfish Company of Ipswich.

One sample of horse-radish which contained beet juice and coal tar dye was obtained from M. Winer Company of Brookline.

Cider which contained sodium benzoate not so labeled was obtained as follows:

One sample each, from John Primak and Fritz Crumert of Concord.

Olive oil which contained cottonseed oil was obtained as follows:

Two samples each, from James Tiberri of Southbridge; Cantania Importing Company of Boston; Leo J. Meucoboni of Framingham; Henry Razzaboni of Somerville; Antonio La Flatta of North Attleboro; and Guy Fielippeli of New Rochelle, N. Y.; and 1 sample each, from Central Meat & Grocery Company, Incorporated, and James Stevens of Southbridge; De Baggio & D'Errico of Franklin; Josephine Manzo of Brockton; R. Bartolini of Framingham; Antonio Paresi of Quincy; Michael Gaglione of Cranston, R. I.; and Stefano Brothers* of New York.

Olive oil which contained corn oil was obtained as follows: One sample each, from Benedetto Coviella of Lynn; and Stefano Brothers* of New York.

Olive oil which contained corn oil and cottonseed oil was obtained as follows:

Two samples from Stefano Brothers* of New York; and 1 sample, from Cantania Importing Company of Boston.

Hamburg steak which was decomposed was obtained as follows: 1 sample each, from Matthew J. Gula of Easthampton; New England Market, Incorporated, of Cambridge; Mrs. Margaret Jackson of Brockton; Colonial Market, Incorporated, of Waltham; Elzear and Godiace Lussier of Fall River; Economy Grocery Company, Incorporated, of Hudson; Simon Grenon and Brockelman Brothers Company, Incorporated, of Marlboro; and Jack Kaplan of Woburn.

Hamburg steak which contained a compound of sulphur dioxide not so labeled was obtained as follows:

One sample each, from Harry Brockman of Roxbury; and Unofrio De Losa of Waltham.

Hamburg steak which contained a compound of sulphur dioxide not so labeled and was also decomposed was obtained as follows:

One sample each, from Woburn Food Centre of Woburn; and Donald W. Smith of Newton.

Sausage which was decomposed was obtained as follows:

Two samples each, from Economy Grocery Stores Corporation of Cambridge; and Massachusetts Mohican Company, Incorporated of Springfield; and 1 sample each, from Economy Grocery Stores Corporation of Fall River and Springfield; Jacob Winocoor of South Boston; Samuel Bonder of Roxbury; Edward Bloom of Newburyport; Union Foodland, Incorporated, of New Bedford; New England Markets, Incorporated, and Albert Hamwey of Cambridge; Elizabeth Havender of Newton; Elmer J. Cochrane and First National Stores, Incorporated, of West Newton; and Thomas Di Cicco of Newton Upper Falls; Simon Grenon and Brockelman Brothers Company, Incorporated, of Marlboro; David Hill and Emelio Torelli of Framingham; Stop and Shop Store of Lexington; Myer Elgart and Woburn Food Centre of Woburn; Donat L'Heureux of Salem; Neighborhood Stores, Incorporated, of Athol; Kelsey's Markets, Incorporated of Great Barrington; Neway Market, Incorporated, and Solin's Market, Incorporated, of Chicopee; Richard Omer and Herbert Tillman of Springfield; Francis Quink of Belchertown; Big Four, Incorporated, A. & S. Richton, Harry Leavitt, W. L. Rich, and Simon Kronick of North Adams; Helen Soja of Southampton; Natalie Chagnon and John Obertuck of Gilbertville; Jos. Rajewski of Easthampton; and Stanley Bonkowski of Westfield.

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* Firm not in existence—correspondence returned.

Sausage which contained a compound of sulphur dioxide not so labeled was obtained as follows:

One sample each, from Charles Fiermont of Newton, and Antonio Grapposa of Natick.

One sample of sausage which contained in excess of 2% cereal and vegetable flour was obtained from Woburn Food Centre of Woburn.

Lamb patties which were decomposed were obtained as follows:

One sample each, from Economy Grocery Stores Corporation of Fall River; First National Stores, Incorporated, of New Bedford; and Elizabeth Havender of Newton.

There were 15 confiscations, as follows:—14 pounds of decomposed chickens; 866 pounds of decomposed chickens and fowl; 4,381 pounds of decomposed turkeys; 30 pounds of decomposed beef trimmings; 30 pounds of decomposed beef liver; 25 pounds of decomposed pork hearts; 10 pounds of decomposed bacon; 25 pounds of decomposed cold cuts; 2 pounds of decomposed hamburg steak; 15 pounds of decomposed pigs' ears; 30 pounds of decomposed salt pork; and 20 pounds of decomposed cheese.

The licensed cold storage warehouses reported the following amounts of food placed in storage during August, 1940: 227,670 dozens of case eggs; 789,093 pounds of broken out eggs; 562,441 pounds of butter; 1,144,726 pounds of poultry; 2,853,532 pounds of fresh meat and fresh meat products; and 14,484,112 pounds of fresh food fish.

There was on hand September 1, 1940: 2,955,120 dozens of case eggs; 2,460,708 pounds of broken out eggs; 4,944,006 pounds of butter; 4,841,279 pounds of poultry; 3,300,450 pounds of fresh meat and fresh meat products; and 29,990,764 pounds of fresh food fish.

The licensed cold storage warehouses reported the following amounts of food placed in storage during September, 1940: 265,140 dozens of case eggs; 725,370 pounds of broken out eggs; 337,322 pounds of butter; 1,515,233 pounds of poultry; 1,932,491 pounds of fresh meat and fresh meat products; and 9,879,595 pounds of fresh food fish.

There was on hand October 1, 1940: 2,225,880 dozens of case eggs; 2,165,814 pounds of broken out eggs; 4,056,185 pounds of butter; 4,599,384 pounds of poultry; 2,700,240 pounds of fresh meat and fresh meat products; and 29,658,631 pounds of fresh food fish.

The licensed cold storage warehouses reported the following amounts of food placed in storage during October, 1940: 311,550 dozens of case eggs; 983,191 pounds of broken out eggs; 552,846 pounds of butter; 2,047,599 pounds of poultry; 2,266,035 pounds of fresh meat and fresh meat products; and 10,017,577 pounds of fresh food fish.

There was on hand November 1, 1940: 1,368,630 dozens of case eggs; 2,003,803 pounds of broken out eggs; 3,530,565 pounds of butter; 4,266,646 pounds of poultry; 2,651,545 pounds of fresh meat and fresh meat products; and 30,901,331 pounds of fresh food fish.

The licensed cold storage warehouses reported the following amounts of food placed in storage during November, 1940: 345,780 dozens of case eggs; 688,279 pounds of broken out eggs; 285,469 pounds of butter; 3,929,590 pounds of poultry, 4,516,254 pounds of fresh meat and fresh meat products; and 7,684,960 pounds of fresh food fish.

There was on hand December 1, 1940: 763,680 dozens of case eggs; 1,677,239 pounds of broken out eggs; 2,573,028 pounds of butter; 6,587,238 pounds of poultry; 5,525,738 pounds of fresh meat and fresh meat products; and 29,803,702 pounds of fresh food fish.

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THE COMMONHEALTH

Volume 28 April - December
No. 2 1941

RADIO NUMBER

(GREEN LIGHTS TO HEALTH)

MASSACHUSETTS
DEPARTMENT OF PUBLIC HEALTH

THE COMMONHEALTH

QUARTERLY BULLETIN OF THE MASSACHUSETTS DEPARTMENT OF PUBLIC HEALTH

M. LUISE DIEZ, M.D., DIRECTOR OF DIVISION OF CHILD HYGIENE, EDITOR.
73 Tremont Street, Boston, Mass.

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THE FAMILY DOCTOR

A. WARREN STEARNS, M.D.
Dean, Tufts Medical School

Green Lights to Health Broadcast, WAAB—November 20, 1940.

At the dawn of history when human beings started recording their activies there were certain individuals who practiced the healing art. Physicians are mentioned in the oldest chapters of the Bible as such, though there is some doubt as to whether individuals at that time devoted their whole effort to healing. In the beginning healing was closely related with the priesthood because persons who were sick were thought to be affected by evil spirits, so it was necessary for the medicine man to purchase health by propitiating the good spirits, and to ward off or drive away disease by destroying the evil spirits. The elaborate system of incantations and rituals was devised with this purpose in view. Gradually the rudiments of physiotherapy and pharmacology came in. The American Indians furnished an example of the medicine of primitive persons, and we have considerable knowledge concerning their activities. In certain conditions they put rocks in the bottom of a cave, built a fire and then got very warm and sat there until they perspired freely, and then ran out and jumped into cold water. Thus they practiced a rudimentary physiotherapy. The medicine men had considerable knowledge of the herbs and drugs derived from them and their medicinal effect. These herbs were carefully selected and saved, and later brewed into forbidding concoctions. One of the best examples of the stoicism of the savage is his ability to take terrific doses of obnoxious medicines.

And so one may measure the state of civilization by the quality and character of medical practice. Up through the classical period, with the decline of superstition and the rise of rational thought, the foundations of a good deal of modern science were laid down. This was particularly true of medicine and much that we do and much that we know today can be traced directly to Grecian times. Then followed a long period, the so-called Dark Ages. During this period there was very little development in the scientific aspects of medicine. If anything, there was decay and a recurrence of superstition. As late as the time of John Winthrop, the first Governor of Massachusetts, this condition persisted. John Winthrop, Junior, having prescribed buttered musket balls for a disease, added that they should be taken on the full of the moon, and that if a bit of a lion's mane could be obtained and hung under the left arm it would also help!

Then came the great scientific awakening, interest in the natural sciences appeared here, there and everywhere. Medicine of all the learned professions was the first to adopt the data of science and to pursue the scientific methods. Medical schools were rehabilitated and men with scientific ability and research propensities were procured as professors. Whereas in former times students had been taught to worship the art of medicine, in later years science became the God of the doctor. Science not only became the God but became the religion, and to some extent, techniques, procedures and theories occupied the minds of the best doctors. The human interest factors were not so much in the foreground. In the old times, the very limitations upon the doctor forced him to become the comforter and helper of those in distress and trouble. If he could not save the life of a child, he at least could comfort the bereaved parents. If he could not cure the aged man of his affliction, he could make life appear a little brighter and less forbidding.

In the selection of students for medical schools those with scholastic aptitude, those with high marks in chemistry and physics were chosen, sometimes to the exclusion of the socially minded. And so the troubled patient, many of whose troubles were of the soul as well as of the body, upon going to a docto often had a specimen of a body fluid studied in the laboratory. Perhaps drop of blood was taken from the ear by a nurse. This led oftentimes to admission to a diagnostic clinic where more body fluids were studied by chemist and other technicians. The relations between doctor and patient were gettin to be more and more impersonal, but there is a system of balancing checks i nature, which keeps us from going too far from the desired path. And s today, we are at the turning of the ways. Everywhere medical student are being taught the importance of the personalities of their patients, an they are urged to interest themselves in the social problems of the sick. W would not make them poorer chemists but better doctors. The doctors hav delegated a great many of their duties, first, to nurses, then to social workers and finally to laboratory technicians. By delegating certain of their function to nurses, social workers and technicians, the doctors have extended the spher of their usefulness tremendously, but we must be careful in so delegating ou duties lest we wash our hands of our responsibilities.

At last the pendulum has turned. There are two great sentimental value in medicine equally important, the one supplementing the other. Undoubtedl the highest development is altruism which comes through the scientific research and investigation, by which knowledge is uncovered eliminating diseas from future generations. There is no priest devoting himself to his task wit complete self-negation who has any higher and holier purpose than the scientist working in the laboratory with little thought of self-aggrandizement but with great hope of discoveries whereby civilization may be advance through better health.

We must not belittle this precious asset of society in presenting the other but we must not forget that the first and oldest function of the doctor is t comfort and assist the afflicted individual. Part of the scientific developmen of medicine has resulted in a tremendous amount of specialization. Each on of us tends to pick out some narrow field and perfect himself in that alone By means of specialization medicine has advanced markedly, and the presen age may be said to be one of specialization, and because of it much of ou progress has resulted. But one of the great lessons of specialization, one o the great lessons of laboratory medicine, is the fact that there should be a basic doctor, well-trained, experienced, sensible and kindly, commonly calle the family doctor. He knows each one of us. He is aware of our specia tendencies and susceptibilities. He knows how to get along with us and how to care for our minor ills without elaborate laboratory tests or expensive surgical operations. And so we are entering a stage in which the famil doctor is placed on the frontier. Through him all sick persons should clear. The patient who shops around among specialists or clinics often gets the poorest medical treatment, although perhaps getting the best scientific study. All hail to the family doctor, still the backbone of the medical profession, and so the bulwark of society against disease.

WHAT A HEALTH EXAMINATION MEANS

Michael E. Murray, Jr., M.D.

Department of Hygiene, Harvard University

Green Lights to Health Broadcast, WAAB—December 17, 1940

A hundred years ago when Mr. Jones called in the doctor we knew that he must be pretty sick, dying maybe. In those days people didn't consult the doctor until they were in real trouble. Yet almost one hundred years ago, in 1850 to be exact, a prominent Bostonian, Lemuel Shattuck, was advocating a measure which called for visits with the doctor when one wasn't sick at all. At that time typhoid fever, malaria, smallpox, diphtheria and such plagues were rampant. The important advances to be made clearly were in the field of public health. Mr. Shattuck felt nevertheless that more attention should be paid to personal health; that individuals should be encouraged to have frequent "sanitary examinations" made of themselves in an effort to promote their health and to prevent disease.

Since that time there has been a growth of the idea in certain directions, yet there seems to be a lack of enthusiasm for it on the part of the people in general and to some degree within the medical profession itself; the laymen, perhaps because it seems unnecessary to go to the doctor when one is perfectly well; some doctors, because they may feel that there is not enough to be accomplished by such measures. Modern medicine surely should not be, as it has been in the past, primarily engaged with death, pain and disease, but should concern itself more with health, happiness and life.

Legend has it that the ancient Chinese paid the doctor as long as the patient remained well. Yet experience shows us that although many Orientals may live to a ripe old age, they all seem to reach the same eventual state of physical dissolution, whether they have paid the doctor to keep them well or not. Now the question is, it seems to me, whether or not such a thing as a periodic health examination can be of any real value in helping us to lead healthier, happier, and longer lives.

At a matter of fact, infants and young children have examinations at fairly frequent intervals. Children of school age in many parts of this country, through the agency of the school physician and school nurse, are given some kind of a health checkup at intervals. Many adults undergo an examination when they apply for life insurance. In industry clinics have been set up for examination of employees. There remains a tremendous group of people, nevertheless, not reached through these channels, people who have no family physician and who lack the initiative to seek out a physician in whom they can place their confidence and to whom they can turn for medical advice.

It seems to me that every adult ought to have a doctor who knows him as an individual person and who has more information about him than mere data regarding his age, weight, blood pressure, etc. We are all going to need the doctor sometime, and calling upon a physician who has known us and who has examined us in the past is much more satisfactory from point of view of both patient and physician than a situation in which an acutely sick person has a strange physician see him for the first time.

Another obvious consideration, of course, in having such a relation with a personal or family physician is that he gives us a thorough examination at the beginning of the relation and re-examines us from time to time for the purpose of discovering physical defects or the signs of early disease, and in general helping us in any way that he can to maintain a state of good health.

It might be well to discuss briefly what such an examination entails. The physician will ask something of one's family history, inquire into the details of one's past illnesses and will also determine whether or not one is having any difficulties at the time of the visit. He will then proceed to do a careful examination of the skin, eyes, ears, nose and throat, heart, lungs, abdomen, the determination of blood pressure, a search for any unusual lumps, etc. The doctor will also take a sample for analysis and may do a blood test.

My feeling is that too much stress cannot be laid upon the value of the history. In recounting the illnesses, accidents, operations, trials of our past lives, we may very well give information which is of great importance although it may not appear to us to be of any particular significance. In this connection I think it is well to remember that the things which we tell the doctor are held in confidence by him and there is nothing to be gained by concealing something which may be difficult to talk about. Frequently a good talk with the doctor will help to straighten out troubles which are rooted in worry, fear, or discouragement. Emotional difficulties, though they may not kill us, can without any doubt make us just as sick and ineffective as the grossest kind of organic disease. An organized set of emotional difficulties, by the way, has a name. It is called a neurosis. There are times when the wise family doctor can do much to help us maintain a solid emotional balance.

To get back to our examination, after the history is taken, a careful physical examination is done, including the procedures which I have already mentioned. I also feel that a Wassermann test or one of its modifications should be done. Further blood examination may not be necessary in all instances, but a hemoglobin determination and an examination of a blood smear I think ought to be included in most cases. A white blood cell count and red blood cell count should be done if indicated. In the event that these are all normal they serve as a base line for comparison if any of them change later in life.

After these things have been done, the doctor will discuss the results of the examination with the patient and will answer his questions the best way he can.

Most of us will be found to be in fundamentally sound health or to have only some minor deviation from the normal. We then have the assurance that within the limits of such an examination we are in a state of good physical health.

In some instances, of course, the physician will find the existence of definite disease and will recommend treatment, or he may find some suspicious signs for which he will ask us either to report later for further observation or he may recommend further immediate investigation, such as a chest X-ray, stomach or intestinal X-ray, blood chemistry determination, or an electrocardiogram; these things being done, of course, only when indicated. A metabolism test may in some instances be recommended.

There is no reason to believe that our family doctors are unable or unwilling to take the time and pains to do a good job. Some of us may still have a picture of the family doctor as a kindly old gentlemen with long whiskers who hitches Dobbin to the gatepost, comes in for a visit and limits his examination to a look at the tongue and a pat on the back. I suppose such ideas make some people prefer to place themselves in the hands of a so-called health institute.

I know that we can find plenty of well-trained physicians who are going to give us careful and competent attention, men in whom we can place our confidence. I feel that every adult ought to have such a physician as his own doctor, and that a careful examination should be done at the beginning of this relation. If then, the individual subsequently becomes ill or has some symptoms which worry him, he should report to this same physician. If he remains in a state of good health, he ought to continue to see him from time to time; probably best, every year; but certainly every few years. I prefer to see my doctor every year.

If expert advice or some of the more complicated laboratory procedures are in order, our physician then can help us in securing the services of the appropriate specialist. He can also be of tremendous help to the specialist in furnishing background information so necessary for the intelligent evaluation of our particular problem. This way we can be sure that, in so far as the present state of the art and science of medicine goes, we are getting the best. If we happen to be somebody who has a limited budget, we can be thankful that we live in this country where through one channel or another good medical care can be had by all. But we have to go and get it. It won't just come to us.

One might ask what kind of abnormality might be discovered at such an examination. There are quite a few things which might be found, although if many of them existed to any serious degree, the patient would probably have some kind of symptoms. One of the various anemias might be found. Sometimes the finding of a definite degree of anemia leads to the discovery of some underlying cause for it. Tuberculosis in its earliest stages is usually not detectable by physical examination of the chest and would not be discovered unless it were advanced enough that the patient had some symptoms or some definite physical signs. Any suspicious symptoms, such as persistent cough or the inability to maintain normal weight, would lead the examining physician to recommend a chest X-ray for diagnosis. Certain types of early cancer might also be discovered. When such a discovery is made, appropriate treatment can be given with a good chance for complete cure, whereas cancer in an advanced state, as we know, is not nearly so amenable to treatment.

I recently heard of a woman in her forties, who, in the course of a routine physical examination, was found to have a small ulcerated area. It was smaller than a dime. A small specimen was taken from the region and it was found to be suspicious of early cancer. She is having well-planned treatment and her chances of getting complete relief are almost 100%. A number of other conditions which might be uncovered are high blood pressure, certain types of heart disease, chronic Bright's disease and diabetes. Complete cures for some of these maladies are not known, but in some conditions, such as diabetes, the physician can prescribe treatment which will make a long and useful life possible where neglect of the disease would be disastrous. In certain other diseases, modification of one's mode of life, especially with regard to work, diet, exercise and rest, may be of utmost importance.

There is one drawback which I think might be mentioned. An examination which reveals no evidence of ill health may sometimes create a false sense of security. It must be remembered that the physician is not an omniscient being and that some diseases have an insidious beginning, sometimes existing in an early stage without presenting symptoms or signs, and not being apparent even after the most painstaking examination.

Why then do we advise these examinations? I think that a question of this nature can be answered best by summing up the points which I have previously tried to make. FIRST OF ALL, I think that we all ought to have a complete examination early in adult life to determine whether or not we have any physical defects or whether we have the early stages of disease. We ought to have such basic information so that we can correct any defects which are amenable to treatment. If we are found to have some condition for which there is no complete cure, we can then, at least have competent advice in the regulation of our daily lives. SECONDLY, I should like to stress my feeling that we should, each one of us, establish a relation with a doctor whom we choose as our physician and medical adviser and whom we can consult subsequently either because of illness or for advice about many of the knotty problems which are bound to vex us from time to time. It is far better to turn to an intelligent physician who has some common sense and both feet on the ground than to take our medical advice from well-meaning neighbors, faddists, cultists.

In conclusion may I re-emphasize my belief in the importance of having a personal or family physician. Let him give you a thorough examination. Let him see you from time to time. Once a year is not too often. Get your advice about health problems from him. Let him, in what ways he can, help you to keep well, and in time of illness call on him.

WHEN AND HOW TO CALL THE DOCTOR

FRANCIS P. DENNY, M.D.
Brookline, Mass.

Green Lights to Health Broadcast, WAAB—March 5, 1941.

Of course, we always send for the doctor when a member of the family seems very sick. When, however, the illness seems slight, the question of whether or not to send for him is a very difficult and important one to decide. There are a few serious conditions requiring prompt treatment, the first symptoms of which are very slight and mild. In other words, there are occasionally cases of apparently slight illness where the prompt calling of a physician means the prevention of a serious illness or even the saving of life.

In order to avoid serious mistakes, we must frequently send for a physician for illnesses which prove to be trivial and which would correct themselves without any medical aid. We must consider that the physician's fee under such circumstances is a form of insurance which has protected us against the possibility of a terrible loss.

It is my purpose to suggest here a few of the symptoms which are danger signals of troubles which require prompt medical attention.

Sore Throats

In past years one of the serious mistakes which was frequently made was failure to send for a physician for a sore throat, especially in those cases where white spots were to be seen in the throat. The danger was, and still is, that this may be diphtheria, which if not treated promptly is a very serious and often fatal' disease. At the present time so many of the children are protected against diphtheria that this disease is becoming very rare. Still we have some cases and occasionally a death which results from failure to call a physician promptly. There are also other serious throat infections, especially those due to the streptococci where prompt treatment is essential.

Rashes

It is very difficult for anyone not a physician to make a diagnosis of the contagious diseases. Even slight rashes should be seen promptly by a physician because they often disappear quickly and then it is impossible to determine what the diease has been. Scarlet fever is often overlooked in this way, the true nature of the disease first becoming evident when a serious complication develops or when another case comes down in the same family. For the protection of the patient, the family, and the community, a physician should be called promptly for a rash.

Coughs, Colds, Fever

It may not be necessary to send for a physician for every "cold," especially if one will take proper care of himself. Care is very necessary when there is fever and general aching and it should be an invariable rule to stay in bed when there is any fever; in this way many cases of pneumonia would be prevented.

A physician should always be sent for when the temperature is considerable (whether accompanied by a cold or not) or persists for more than twenty-four hours; also where there are chills, pain in the chest, or rapid and labored breathing..

Furthermore, we should always consult a physician for a cough that persists for more than two weeks, and return for repeated examinations until the cough is cured. Many a case of tuberculosis has reached an advanced stage because of neglect of a cough.

Abdominal Pain

Some of the most serious mistakes that are made result from failure to call a physician promptly for abdominal pain. Pain in the abdomen from whatever cause is usually at first thought to be due to indigestion and to gas. One's natural inclination under such circumstances is to take a laxative, but this is often the worst thing to do, because it usually increases the pain and tends to spread the inflammation which nature is trying to wall off.

Severe pain due to indigestion is very rare except after some very obvious indiscretion of diet as in the case of a small boy who has eaten green apples. There is almost always some other cause.

Among the causes of abdominal pain which require prompt treatment is appendicitis. The pain here is not always in the right lower side of the abdomen but often at the start it is in the upper part or even at times on the left side. Obstruction of the bowels, and perforation of the stomach or bowels, are other causes of acute abdominal pain which require prompt treatment if the patient is to recover. Remember then to call a physician at once for severe abdominal pain, and don't give a laxative.

Sepsis, Blood Poisoning

We all know the dangers of infected wounds. For their prevention the prompt treatment of every wound, except the more trivial ones, by a physician is most essential. It is very important that a physician should be called for those wounds into which dirt, particles of clothing, or other foreign material have been driven. Any wound, however slight, which begins to throb and be painful should have prompt surgical attention.

We have mentioned thus far some of the more important acute conditions which require the calling of the physician on the day that they are first noted. Some of them are so urgent that even hours count. We should like now to call attention to some of the less urgent conditions but where failure to get medical advice within a reasonable time may have in the end an equally serious result. For these less acute conditions it is often possible to see a physician at his office.

Lumps, Sores, etc.

The cure of cancer depends largely on the length of time that elapses between the appearance of the first symptoms and the consulting of a physician. Too frequently there is a long delay which allows the disease to spread to other regions. Do not wait for pain; pain is a late symptom of cancer. Consult a physician for any lump or swelling anywhere, but especially in the breast; for any sore or ulceration in the skin, on the lips or tongue; for any mole or pigmented spot which enlarges or ulcerates; for any abnormal discharge.

Indefinite Symptoms

The symptoms of many serious diseases are very slight and indefinite at the outset. We ought, therefore, to make it a practice to consult a physician whenever we feel below par, when we tire easily, have a poor appetite, lose weight without obvious cause, when we become short of breath on slight exertion, have headaches, dizziness. All of these and many others of like nature may be symptoms of many different diseases, on the early recognition of which much depends.

Why Wait for Symptoms?

It is often possible for the physician to detect weak spots in our human machine, the early stages of serious disease, before we realize that we are not in good health. The knowledge that we have such weak spots enables us to adjust our lives so that the strain is taken off weak organs and life can be greatly prolonged. As Dr. Holmes said, the surest way to reach a good old age is to discover early that you have an incurable disease. We ought, therefore, to consult a physician at least once a year (for instance on our birthday) even when we feel in good health, and have him make a thorough examination.

Most of you will feel that no advice is needed as to "'how to call the doctor." Practising physicians, however, will think otherwise. Let me give you some illustrations. A member of the Smith family has suddenly been taken ill. The symptoms are serious and alarming, there is a real emergency. A message is, therefore, left at the doctor's office for him to "call as soon as possible."

In the Jones' household after considering for several days the question of sending for the doctor, they finally decide to do so. Human nature is such, however, that the longer a person has considered the question of sending for the doctor, when that decision is made, the sooner they want him to come. So, although there is obviously no emergency Mrs. Jones puts in a message at the doctor's office for him to "call as soon as possible."

Mrs. Robinson's child has a cold and as she is anxious to have the doctor call early so that she can keep a bridge engagement, she leaves word at the doctor's office "call as soon as possible."

One can easily picture the doctor returning to his office and finding these three messages, all reading "call as soon as possible." One is for a real emergency, but how can he tell which it is. Now the number of real emergencies in a physician's practice are very few. Physicians often give up their meal hour and neglect much sicker patients in responding to apparently urgent calls where in reality there was no urgency. The inevitable result is that the message "call as soon as possible" is not always given serious consideration, and prompt medical aid in real emergencies is sometimes not obtained.

The difficulties referred to would be obviated if everyone would remember two things in calling a doctor:

First, if there is an emergency use the words *very urgent* and state the nature of the emergency; thus "hemorrhage," "convulsions," "very difficult breathing," etc. This not only indicates the need of haste but enables the physician to bring with him whatever he will need to meet the emergency.

Second, if there is no urgency do not suggest the need of haste in the message. By crying "'wolf" when there is none, people often fail to get prompt medical aid when most needed.

If a patient is kept quietly in bed, a few hours' delay in the arrival of the doctor will seldom retard the recovery of the patient, except, of course, in the case of real emergencies. The message to call "sometime today" or even "this morning" is a great help to the doctor in planning out his day's work, while calls unnecessarily suggesting haste are a hindrance.

Shorter hours of work have been the almost universal rule in all occupations, trades, and professions. The seven-hour day and five-day week are now very common. For the physician in general practice it is still the seven-day week, while there are days when the working hours have to include most of the twenty-four.

It is probable that the general public could do something towards making a physician's life less arduous by a little more thought when calling for his help. We, therefore, make the following suggestions: Do not urge haste when none is necessary. Do not request calls in the evening and on Sundays and holidays for troubles that can be equally well attended to at other times.

OBSTETRICAL CARE TODAY

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Green Lights to Health Broadcast, WAAB—February 5, 1941.

For countless generations women have been having babies. It is a common, rather expected, incident and perhaps for that reason one taken somewhat as a matter of course. A general feeling exists that the average woman can have a baby anywhere, even with or without a doctor. This is augmented by the occasional newspaper report of childbirth in a taxi, police ambulance, bombproof shelter or the like. All of this is true in a sense. It is agreed that most women pass through their prenatal period and delivery without any trouble. But it is highly important to tell all husbands and wives who are planning a family to be on the alert for certain things.

First of all, it is important to consult an obstetrician even before conception occurs and undergo a complete examination. If this is done and pregnancy is considered safe, it is advisable to return for prenatal care at regular intervals, usually once a month during the first six months, then twice a month for the succeeding two months, then once a week during the last month.

Excellent booklets on prenatal care are available from both the State and Federal governments. These may be obtained from the Massachusetts Department of Public Health, Division of Child Hygiene, 73 Tremont Street, Boston, and from the U. S. Department of Labor, Children's Bureau, Washington, D. C.

It is well to mention a few danger signals which may occur during pregnancy. A common one, often considered by the patient as unimportant, is bleeding. Possibly because woman has experienced cyclical bleeding from puberty to the menopause, she is prone not to be surprised or disturbed at the appearance of blood during her pregnancy. One would rush to the phone and call her doctor if she coughed up a mouthful of blood, and this reaction is due in part to the education of the public concerning tuberculosis and cancer. Bleeding during pregnancy is distinctly abnormal. To be sure, there are scattered instances of slight bleeding during early pregnancy, often occurring at monthly intervals, but these are rare and the seriousness of the situation should be decided by the physician. Bleeding during the first three months, particularly if accompanied by pain, may signify the possibility of either a pregnancy beginning abnormally in one of the tubes, or a threatened miscarriage. Bleeding during the last three months of pregnancy, if painless, strongly suggests the presence of the afterbirth in the lower part of the uterus. If the bleeding is accompanied by pain, the possibility of partial separation of the afterbirth from its attachment to the uterus has to be considered. It is clearly evident, therefore, that the patient should place herself in the care of a thoroughly competent physician as soon as she suspects the existence of pregnancy. It is obviously also important for her to have the facilities available in a good hospital and, if possible, one limiting itself to the care of obstetrical patients.

Another complication of pregnancy is called toxemia. This term refers to a group of symptoms, of some of which the patient may be aware, and others recognized only by her physician, usually occurring during the last three months of pregnancy. The patient's symptoms are any one or all of the following: headache, disturbances of vision, nausea or vomiting, a feeling of listlessness or irritability, and swelling of the ankles, hands or face. In severe cases, there may be pain in the upper abdomen, unconsciousness, or even convulsions. The symptoms noted by the physician often begin before the patient is aware of any change in her condition, and here the real importance of periodic examinations during pregnancy is evident. One of the first signs is an abnormal increase in weight. It is to be remembered that normally one gains approximately twenty-four pounds, four during the first three months and ten during each succeeding three-month interval. Other signs the physician observes are that the patient's blood pressure is higher and that albumin appears. Toxemia, if neglected, can lead to very serious consequences for both the mother and her baby. If recognized and properly treated, the outlook is excellent. A pregnant woman would naturally like to avoid this condition. Such avoidance cannot be promised in every instance, because the true cause is not clearly understood. However, certain predisposing factors are known. She should be careful not to gain too much weight; to eat a well-balanced diet containing adequate vitamins and minerals, to obtain enough sleep and to rest in the middle of the day, to place some restriction on fluids if an abnormal degree of swelling appears, to use very little salt other than cooked in the food, and to maintain regular bowel habits.

One of the greatest scourges through the years in obstetrics has been the danger of infection. The sources of infection are multiple. During pregnancy, the patient should be instructed concerning marital and personal hygiene. Tub baths should not be taken during the last six weeks of pregnancy. Rupture of the membranes manifesting itself by the passage of fluid, of which the patient has no control, should be reported at once. Another source of infection may be improperly sterilized instruments or supplies. Germs may be introduced by the doctor himself, unless his hands are properly scrubbed and gloved. All persons in contact with the patient at the time of delivery should wear masks to prevent germs from the nose and throat coming in contact with the patient. Visitors who have upper respiratory infections should not be allowed to see the patient. Unfortunately, even though all these precautions are observed, it is difficult to obviate the possibility of infection from germs which lie dormant in the patient's own birth canal. Perhaps the most common cause of infection in the pregnant woman is the attempt on her part, or by an unscrupulous person, to interrupt pregnancy. Many lives are lost annually and untold sickness caused by this procedure. Interruption of pregnancy, even when performed with good medical indications by skilled operators, is not without pitfalls. Much progress in the treatment of infection has been made during recent years with the discovery of sulfanilamide and its allied compounds.

Well-meaning friends often advise a pregnant woman to have a Cesarean operation. This is very dangerous advice. One has only to remember that it entails the same risks as any other major abdominal operation. The obstetrical indications for this operation are definite, but the actual decision should be left very strictly with the obstetrician or group conducting a maternity clinic. How can the patient or her friends decide if her pelvis is too small, the baby too large, or the presence of an improper position of the baby, or a tumor? Can they decide in cases of a previous repair operation which one should have a Cesarean and which one be allowed a normal delivery? Can the patient or her friends, after the onset of labor, tell if the uterine contractions are proving inadequate to deliver the baby? Can they decide in which cases of bleeding a Cesarean is desirable, and in which cases it is to be condemned? The answer is obviously "No."

It is only fitting that mention be made of the great advances in sleep-producing drugs to minimize the pains of labor. Many young women are told by their elders that in the old days women had no respite from these pains, and that the modern use of drugs for prevention of suffering is harmful to mother and unborn child. But let it be said that thousands of women, nowadays, have little if any memory of their labor or delivery. The intelligent use of these sedatives does not injure the mother or baby. Advances in the use of obstetrical anesthesia have reached a point where the so-called sleepy or narcotized baby is a rarity. One important fact should be held in mind by every pregnant woman: she should not eat a hearty meal following the onset of labor, for in doing so she runs a certain risk of inhaling the food particles into her respiratory system at the time of delivery.

Every so often, the obstetrician is asked concerning the advisability of delivery in the home. It is impossible to achieve similar conditions to those of a well-equipped maternity hospital. The danger of infection is greater, means of controlling hemorrhage are less, facilities for the care of the newborn baby are not as complete, and the proper use of pain decreasing drugs followed by anesthesia is extremely difficult. Excellent statistics are available apropos of home delivery from such clinics as the Boston Lying-In Hospital; but it should be remembered that these patients have received very careful predelivery care, and are allowed to have home deliveries only when they are thought to be perfectly normal. Complicated cases are admitted to the hospital. Today, every pregnant woman is entitled to good obstetrical care, no matter what her circumstances. If her means are insufficient to obtain private care, she can attend maternity clinics, or in rural communities place herself in the care of the town physician or board of health. This fact, coupled with the availability of prenatal literature, prepares the woman of today better than ever before for the safe bearing of children.

The psychological changes during the pregnant state are almost as complex as the physical changes. It is almost the rule that a period of lassitude exists during the first two or three months, and the patient should be aware that this is a perfectly normal state of affairs. The remaining months of pregnancy in general are very happy ones. The patient is imbued with a certain happiness and pride in the knowledge that she is in the process of producing a new life. However, it is only fair to state that there is a subtle change during the last two or three weeks, when a mild impatience and desire for the birth of the baby becomes evident. During pregnancy, moderate emotional instability is common and tears are often near the surface. It is the wise husband who makes due allowances. Women of America today are fortunate to have excellent obstetrical care available. Once the patient has selected her doctor and placed herself in his hands, she should have confidence in him and her future. She is then free often to carry on her vocation for the first half of her pregnancy, and her avocations until she goes to the hospital.

In these modern days when women are usurping business and politics, and driving their husbands back into the home, there seems to be an increasing tendency to bring up bottle babies. It was Nature's intention for the mother to nurse her young, and there is no better food for the new baby than the mother's own milk. It is highly desirable for premature and delicate babies. Nursing also benefits the mother, for by reflex action it hastens the return of the uterus to normal size. Occasionally, in spite of the greatest desire on the mother's part to nurse her baby, she may have an insufficient amount of milk, and if such be the case we are fortunate to have the existing rigid control of the quality of cow's milk and the purity of different sugar preparations for the making of formulas.

The care of the patient following delivery is of great importance. She should return to her obstetrician at the end of six weeks for re-examination. At this time, necessary treatment or exercises may be instituted. Often, very simple procedures will correct nagging backaches or other complaints.

In conclusion, it is the hope of the writer, that he has conveyed the impression that pregnancy is not a condition to fear, that education of the potential mother is necessary in order for her to be able to report any untoward signs as soon as they occur, that she should place herself in the hands of a competent obstetrician or clinic, and that she should have the advantages offered by a well-equipped hospital.

THE IMPORTANCE OF HEALTH RATHER THAN PERFECT SCHOOL ATTENDANCE

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Green Lights to Health Broadcast, WAAB—November 27, 1940.

Schools, both public and private, have now been open some eight to ten weeks and it would indeed be most interesting to really know the number of infections which have already developed among these school children since the opening day. Some of the infections which have developed have been of a mild nature; others have been of a severe nature, and some, unfortunately, have probably proven to be fatal. Can these infections be prevented? Obviously the answer is "yes"—for many, if not most, of them could be avoided. How can they be avoided? They can be avoided by introducing those measures that will prevent children in the school or classroom who are *not sick* from being near or exposed to those who *are sick.* In other words the control of these infections lies *not* so much in the use of drugs and injections but in keeping the sick child home, for that is the only way that contact can be avoided. The old saying that "an ounce of prevention is worth a pound of cure" is still true.

Most of the diseases that are passed on from one person to another by coughing or sneezing are more easily spread during the first few days of the child's illness than at any other time and this, unfortunately, is usually just the time when the child is allowed to go to school. He's not quite sick enough to stay at home, so off he goes to school. One or two days later the family finally realizes that Johnny is sick, so he is then kept at home. However, the damage has been done, for during those days when he attended school he very politely and certainly not in a gentlemanly manner, passed his infection on to his classmates. Perfect attendance on the part of any pupil is to be admired but is it to be admired when such attendance serves as a definite danger to the health of all the other children? Can you possibly imagine any better way to spread disease than the presence of a coughing, sneezing child in a crowded school bus or classroom?

There are times, of course, when it is difficult, if not impossible, to recognize that a child is becoming sick. However, most parents who have a child that is old enough to attend school have had plenty of time in the past to observe his normal reactions and judging from these should be able to quickly realize when he is not feeling "just right." Such easily recognizable signs as loss of appetite, fatigue, and irritability, are often the danger signals and should in themselves be enough to raise the suspicion of the beginning of some form of illness. *This* is the time to keep the child at home. Each family probably believes honestly that they do just this very thing but has not the observant schoolteacher often been the *first* to have recognized these "red lights" and sent the child home?

Prizes, or some other form of honor are often offered to the pupil with perfect attendance. Cannot this be a curse in disguise rather than a blassing? It is certainly true that many children trying to win this so-called honor will not admit to their parents that they feel "under the weather" for fear that they will be kept home from school and thereby lose their chance for perfect attendance. The result is that the child goes to school, slows up his own recovery, and spreads the infection to others. Would it not be far more practical and certainly more sensible to give the medal to the thoughtful and observant parent who kept her child *at home* and thereby protected the other children at school?

When we talk about the spread of infection in schools, the general tendency is to think only of the common cold. Truly this may be the one disease that occurs more often than any other, yet the spread of the so-called "childhood diseases," better known as the contagious diseases, such as measles, whooping cough, etc., offers an even more serious problem, for once they have developed in a school they are more difficult to control. Many of these contagious diseases have as their earliest signs the same signs as the common cold. For this reason it is not only difficult but at times impossible for the family or doctor to tell which a child may be developing, and this in itself is another good reason why a child who does not appear well should be kept from school, at home and in bed, not outdoors, playing with other children, as so often happens.

Measles offers a good example of this problem, as the first symptoms of this disease are coughing, sneezing, a running nose and all of the other signs of the common cold. It is only after these symptoms have been present for forty-eight to seventy-two hours, and just before the rash appears, that the doctor may be able to say that the child has measles and *not* just a cold. Measles is spread more easily before the rash appears than at any other time, so if the child has been allowed to go to school during the time when he appeared to be having a slight cold, he has given it to all of those who have not had it. Now one might say that a child has to have measles sooner or later so he might as well have it now and get it over. If a doctor, or anyone else, could always control the course of a disease there might be some sense in such a statement but, unfortunately, the course of an infection cannot always be controlled. Take the common cold for example, one child may be sick for only three or four days and then make a complete recovery, while another child in the *same family* with the *same cold* may get mastoiditis or pneumonia. The same thing may happen with measles. If you thought for a moment that your child was going to have pneumonia, or was going to have a mastoid operation because he had measles, would you then say "he has to have measles sometime so he might as well have it now"?

This is just one of the many such conditions that could be given but from just this example one can easily see the dangers which may arise with any disease when its course cannot be controlled. If every time a parent sent his child to school with a slight cold, or with the so-called "sniffles" they would stop and think that they were not only making their own child worse but were directly giving a classmate the opportunity to develop pneumonia there would be much less illness among school children and needless to say, fewer deaths. I do not wish to intimate, nor to infer, that every "cold" ends up with pneumonia, a mastoid operation, or some other serious condition, but I do say that these complications as well as many others begin that way. So—why let them begin?

Q. Dr. Eley, what do you mean by "exposure" to a disease?

A. The answer to that question would depend somewhat on the disease. What is usually meant is that an individual who has not had the disease has been in contact with someone who has it.

Q. If you know that a child who has not had a contagious disease has been in contact with someone in school who has it, can you prevent the exposed child from getting it?

A. This would depend entirely on the disease. For example, if it were measles the answer would be "yes." In such a case the exposed child could be given an injection which would either prevent the infection or would allow the child to have the disease in a mild form.

Q. Dr. Eley, you speak of measles spreading so easily in schools. Do all contagious diseases spread that easily?

A. No. Measles and chicken pox spread more easily than any of the other contagious diseases, and for this reason one has to be much more careful when dealing with them. Fortunately the complications of chicken pox are usually not serious but the same cannot be said for measles and some of the other diseases, such as whooping cough and scarlet fever.

Q. If a child catches measles at school is there any danger of giving it to a baby brother or sister at home?

A. If the mother has had measles and the baby is under four or five months of age, the baby will probably not get it. If it is over this age the chances are that it will get it. This, of course, opens up a different but very important side of the subject. The complications of measles, and the chief one of them is pneumonia, are the most common causes of death in infants between the ages of one and three years. So you see a child who catches measles from some other child at school not only becomes ill himself, but may also give the disease to the younger members of the family. The same may be said about whooping cough. The great majority of *children* who have whooping cough recover from it without any serious trouble, but if a small baby at home catches it, the story may be entirely different, as sixty-five per cent of *all the deaths* from whooping cough are infants *under one year of age.* Unlike measles whooping cough may occur during the first few weeks of life and at this age is a very serious illness.

Q. Dr. Eley, you spoke of "childhood" or contagious diseases. Does infantile paralysis belong to this group?

A. Strictly speaking, infantile paralysis is not usually considered as a "contagious" or "childhood" disease. However, it is spread by contact with someone who has the infection.

Q. Every parent in the world is terribly afraid of infantile paralysis. Does it cause as many deaths as measles or whooping cough?

A. No, it does not. And that question brings up an interesting side light on the reactions of people! It is well known that whooping cough and its complications cause the death of approximately 10,000 infants and children in the United States each year. If infantile paralysis was the cause of as many deaths this nation would be in an uproar. No one would let their child go to school if for one moment they thought that he or she had this disease, or even might be exposed to it, yet parents will let their children go to school when they *know* that they have a very suspicious cough and that they may be developing whooping cough. It seems strange that people clamor to close schools if a few cases of infantile paralysis are present yet sit back and do nothing when whooping cough is so prevalent.

Q. Dr. Eley, cannot the schools do something to prevent the spread of these diseases?

A. Practically all schools today have nurses and doctors who do all they can to prevent the spread of these diseases, but after all they cannot visit the home of each child each morning before he leaves. School and public health officials can only do a certain amount. It's up to the parents to help, for it is only through their full cooperation that the best health of school children can be obtained. If parents could only realize that a sick child not only lowers his own resistance to his infection by going to school, but also does his poorest work, they would not be so anxious to get him off in the morning. A sick child with "perfect school attendance" cannot learn as much at school as a well child who has a few absent days against him,—or should we not say "for him." The failure of a child to be promoted from a lower to a higher class may often be the result of poor physical health rather than inability to learn. No child can do good work at school if he is not in good health. Place your child's health above "perfect attendance" if you expect your child to do his best, and to be at his best.

THE ENDOCRINE GLANDS

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Great Lights to Health Broadcast, WAAB—April 16, 1941.

The endocrine glands are small masses of tissue scattered in the body. The cells of these tissues manufacture certain chemical substances which are taken up by blood vessels and dispersed throughout the body. The effects of these secretions are, indeed, pronounced, having much to do with the body height, configuration, strength, propagation, etc. They also strongly affect one's intellectual state and personality.

The activity of these glands is influenced by the nervous system; in fact, the most important gland, called the pituitary, is directly attached to the brain and is partially composed of nervous tissue. The general nutritional state of the body also exerts a definite influence upon the activity of the glands. In order for the cells of these organs to function properly, they must have delivered to them the necessary building stones. Adequate supplies of proteins and vitamins are especially desired.

In normal individuals certain glands work together while others oppose each other in the nature of their work; however, a nice balance is maintained. Nevertheless, this balance may be upset when a gland is destroyed by infections or tumors. Some glands may overfunction due to excess stimulation.

Certain endocrine disorders may be corrected by dietary adjustments or some such general measures which will tend to restore the normal physiological reactions; however, in some patients there may exist such a marked overactivity of a gland that it becomes necessary to remove a portion or all of it. It is necessary to supply to patients who have had destruction of a gland, products prepared from similar glands of animals. Specific examples of these principles will now be considered.

Thyroid

This gland straddles the windpipe in the neck at a point just beneath the "Adam's apple." Enlargement of it is usually easily seen. Goiters due to an insufficient ingestion of iodine are rare in this section of the country; however, toxic goiters are about as common as anywhere else. The cause of this condition is not known, but such things as severe shocks or prolonged nervous strain often play a very important part.

Many people with this condition complain of nervousness, emotional instability, and marked restlessness. They tend to be warm-natured and perspire freely. Palpitation and shortness of breath are sometimes noticed. In spite of the fact that these patients eat more than the average person, they lose weight and are sometimes bothered with intestinal overwork. A goiter is usually noticed and the eyes are quite prominent.

At present excellent results are obtained in the treatment of these individuals. Some can be cured without operation, but in most cases it is necessary to remove the major portion of the thyroid gland. The dangers attending this operation have been considerably reduced.

Sometimes, as a result of wasting, infections, or excessive removal of thyroid tissue, there remains too small amount of tissue to carry on normal function. Under these circumstances a condition called myxedema develops. The symptoms of this condition are opposite to those found with a toxic goiter. These people are greatly slowed up in their mental and physical activities. They are drowsy, sluggish, and lacking in ambition. The skin is dry, cool, and thick. The hair tends to fall out and the nails are brittle. The eyes appear puffy. The voice is coarse and deep. Gain in weight occurs in spite of only a small food intake. Poor elimination is often marked. This condition may be more or less completely cleared up by using preparations of dried thyroid gland of animals.

Dried thyroid is sometimes used to aid reduction in the weight of obese individuals. This medicine should never be taken except under the direction of a physician. We have seen a number of instances of toxic goiter develop following such a regimen.

The glands are the same in each sex, with the exception of one pair. The latter are responsible for the usual recognized differences in the sexes. In the male they cause the development of a beard, a deep voice, extra strength, and cause the individual to be attracted by the opposite sex. In the female they bring about the characteristic configuration of the body, the high-pitched voice and the attraction to males. In each sex there is formed a slight amount of the same type of secretion as is formed in the opposite sex. The quantity of the latter determines how many masculine qualities a female will have and vice versa.

If a male does not develop sufficient quantities of the male hormone he tends to be shy and timid; his beard is scant or absent; his voice is high-pitched and his strength is not as good as normal; his body tends to have an excess of fat and in its configuration appears somewhat like that of a woman.

Some men may be entirely normal in their masculine characteristics until they reach middle life and then develop mental depression, nervousness, irritability, lack of ambition, lack of strength and stamina, hot flashes and decreasing interest in sexual activities. Such individuals are undergoing a male "change of life." These people can be reverted to their normal feeling of well-being by the administration of the male hormone.

From the age of about twelve to fifty, women experience a series of cyclic changes in preparation for the propagation of the race. In a small proportion of individuals these changes are associated with intense abdominal cramps. Definite relief from this can often be obtained by the use of sedatives; however, in some instances it is necessary to administer preparations of the female hormone. Complete relief of the symptoms can be obtained in this manner. Several courses of this medicine often result in permanent relief of the severe symptoms. Irregularities in the cycles can also often be corrected.

A very disturbing phase of life occurs in many women at middle age. At this time they become quite nervous and emotionally upset, having many spells of melancholy. They often feel that their friends and family have forsaken them. Particularly disturbing are the sensations, known as hot flashes, characterized by a feeling of warmth spreading over the body. The patients often describe the sensation of blood rushing to the head. Other changes that may appear in association with this are: arthritis, indigestion, headaches, and high blood pressure. Excellent results may be obtained in the relief of these features by the use of the female hormone. The use of this preparation would be much more extensive were it not for its expensiveness.

Much has been learned during the last few years to aid us in the reduction of childless marriages. Sometimes the trouble is found to be due to dietary disturbances, such as an inadequate intake in the vitamins and proteins. The thyroid and sex hormones are often used to distinct advantage in this condition.

Pancreas

The chief endocrine function of the pancreas is to secrete insulin. When it fails to do this adequately, diabetes appears. The chief symptoms of this are: excessive thirst; excessive appetite; passage of large amounts of urine; loss of weight; dry skin; increased susceptibility to infections. The excellent results of insulin in the treatment of this condition are well known and need no comment at this time.

Adrenals

These small glands rest adjacent to the kidneys. They are essential for life. When they are almost completely destroyed a condition known as Addison's disease develops. With this affection there develops a brownish pigmentation of the skin, marked loss of weight and strength, low blood pressure, etc. Individuals with this disease can be greatly helped by the use of certain substances prepared from the adrenal glands of animals, as well as by using synthetic products.

Sometimes the adrenal glands become overactive, resulting in the development of high blood pressure, diabetes, thinning of the bones, weakness, etc. Women with this condition may develop many masculine characteristics, such as a deep voice, a beard, etc.

Pituitary

This gland is the most important of all as it governs the activity of the others. If it is destroyed, none of the other glands function properly. Overactivity of this gland makes the others become overactive. It also has a great effect on growth. A deficiency of this gland in young individuals leads to the development of dwarfism, whereas excess activity leads to the development of gigantism.

Summary

In conclusion, I would like to state that very dramatic results can be obtained in the treatment of a large number of endocrine disorders. However, there are two factors which somewhat limit extensive use of these products: (1) most of these products are very expensive, and (2) it is often necessary for the physician to carry out certain tests in order to use these drugs most effectively.

ADOLESCENCE

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Green Lights to Health Broadcast, WAAB—December 10, 1940.

Last year I had the privilege of giving a talk on the subject of the "Child and His Environment." At that time I tried to show how, from earliest infancy, the child's life and activities must be so managed and directed that he will develop in harmony with his surroundings, physically and mentally, for it is this harmony with the environment that gives each individual an opportunity to live a happy, well-adjusted and useful life.

In many simple ways, harmony with the environment can be illustrated. In the animal kingdom the striped tiger who crouches unseen amongst the grasses of his native jungle; the long-necked giraffe who stretches up to feed upon the leaves above him; the brown-backed trout that blends into the shadows of the brook bed; all are examples of the endless pains that nature has taken to make her creatures harmonize with their environment. And so, to carry our original theme a step farther, today's talk on "Adolescence" could as well be called "The Adolescent and His Environment."

What, to begin with, is adolescence? The term has been used almost as a catch phrase in recent years; chiefly, I am afraid, to designate a period of life that is associated with irresponsibility—an age when excuses must be made for irregular and unpredictable conduct.

We must stop thinking of adolescence in this way, as of a temporary and insecure bridge between the dependent island of childhood and the settled republic of maturity, for it is actually one of the most important developmental periods of life; yet one that is restricted, interestingly enough, to civilized mankind. Adolescence begins where childhood ends, with the development of distinctive physical characteristics at puberty, and ends with the full and complete emotional and intellectual maturing of the individual into the adult; a period lying roughly between the ages of twelve and twenty-one in the female, and of fourteen and twenty-five in the male.

This is a period of life that is imposed upon civilized man as a penalty for his gift of intellect; or more fittingly, a period that is granted to him in which to prepare for the full use of that intellect. The lower animals take no such time for their development as does man, dogs, for instance, reaching maturity in less than two years, but the lives of all are much shorter than is that of man. The higher animals are more deliberate in their development, the chimpanzee reaching his adult weight of 140 pounds at seven years, but even so, compare these swiftly running lives with the slow years that man must spend upon his ripening process!

The brain of man has nearly reached its adult size by his sixth birthday; from then until the end of adolescence he has nineteen years in which to learn its use, to educate and train it. If a chimpanzee could go to school he would have barely two years in which to acquire his education, before his faculties would be set in maturity. Even among mankind, in uncivilized races, the period of adolescence is so short and fleeting as to seem scarcely to exist. Puberty is barely passed before mating takes place and a simple family life among simple economic and social surroundings begins. Life requires little in the way of preparation, but it has little to offer in the way of cultural advantages or those complexities of civilization that we consider such an essential part of our society.

Here we have the reason for mankind's adolescent period, so tedious to many of our youth, who see in it only a prolonged season of marking time; of waiting until life is really to begin, instead of appreciating it as an interesting phase of life to be lived happily for its own sake. A mature life, lived responsibly, with a full understanding of the obligations that citizenship, a job, marriage and parenthood imply, requires a long period of training, of self-sacrifice, of holding one's growing powers in reserve. For the boy or girl who goes through grade school, who gets a job requiring little skill, who marries early and settles down, this period is shortened; life perhaps is less complex, but the greater rewards are harder to come by. For the youth who wishes and is able to acquire a higher education, possibly extending even to college and graduate education beyond college, the preparatory period is prolonged, but the rewards, as well as the responsibilities, are increased.

It is the growing pains of this waiting period; the urge to use developing powers; the impatience with a subordinate position in life; the slow process of weaning from a necessary dependence to a capable independence, that furnish us with the problems of adolescence.

Fine distinctions in definitions are probably of little importance, but I should like to abandon, temporarily, the word "adolescence," with its muddied psychological inferences, and substitute the term "youth." There is more of inspirational value to the word; it brings to us the idea of vigor, of freshness, of high spirits. We would all, of any age, like to be considered youthful; the elder among us prefer to believe that our adolescence is of the past. The idea of preparation is implied in the word "youth," but in our country, and in the other free countries of the world it is the idea of preparation for greater individual things ahead, for the exercise of a sound and sturdy personal independence.

It is with this idea in mind that we look to the well directed youth movements to point the way to certain goals and to provide leadership towards them; to help furnish our adolescent population with inspiration and insight so that we may develop a body of the nation's youth that will grow into an army of mature, well-adjusted men and women; a peace-loving army, but one that is willing to fight for peace, if necessary. We have seen how youth can be moulded and disciplined and exploited; how the idea of mass obedience can be instilled into it for the service of the state alone, and we do not like that solution of the adolescent problem.

Our own form of society is based upon the family; it is the family circle that comprises the early environment of the child, and it is to the home first, and then the larger world outside that first the child and then the adolescent youth must be taught to adapt his behavior.

Our problem as parents is to understand the problems of our growing children so well that we can be of the greatest service to them in their adjustments to life. The heartaches, the frustrations, the disappointments of our young people are all the more poignant because they may have had no experience in dealing with them and because, in so many ways, their lack of economic independence ties their hands. The adolescent boy or girl is making a transformation from the passive attitude of the child to the aggressive, active, self-reliant attitude of the adult, and often doubts his or her ability to make the change. With adolescence, also, comes first a real appreciation of ethics, or moral principles, and with this an awakening of conscience. Having this innate desire to do right, combined often with a vast ignorance of what is right, it is not strange that the youth develops an anxiety neurosis or reacts in various other ways to the uncertainties that seem to surround him.

If we have built our family life upon a secure foundation, the home will remain a haven; a place of security to which to return when the seas run too high for the frail craft and its inexperienced helmsman. If we have been nagging, dominant or harsh, or stern in discipline, selfish about our own pleasures and over-jealous of our parental prerogatives, we will lose our children before they have outgrown their need of us, and we may well deserve our loss.

Discipline there must be, of course, in the bringing up of children, and the sooner even the infant knows that there are rules to be observed, the sooner will he be started on the path that leads to a well-adjusted childhood. Discipline, however, can usually be presented so that its justice is obvious, and if the activities and the reactions in the home have been tempered with kindliness and forbearance, it will be both a rallying point and a harbor of refuge for the youth.

There are a great many things that most of us have learned as we have gradually and painfully acquired our own life experience. We wish that we could hand the benefits of this experience and the knowledge so gained on to our own sons and daughters as free gifts at the time when they need them most. We cannot do it. Parental lecturing is a waste of words and every youth eventually worth his salt is a rebel whose most lasting lessons will be learned as a result of his own experience.

The patriarchal system of family dominance by the elders is at an end. Our modern family is a democracy in which each has a voice and vote according to the ability to use it. The period of youth is also a period of revolt and must be recognized as such and respected, for the spirit of revolution is usually a healthy one.

If the parent leads in this family democracy, as the parent should lead, it is because the proper qualities of leadership are there—tolerance, justice, fair-mindedness and self-control. To this parent the youth, even while maintaining his cherished independence, will turn for advice, and may occasionally follow the advice that is given. If parental advice, offered to this age group without force of arms, is even occasionally accepted we can say that that adviser has made at least a partial success of parenthood.

If this respect is to be accorded, however, parents must truly represent the type of individual they would have their sons and daughters be. Even when they are apparently most openly rebellious, our children may be found outside the family circle quoting the parental word as the highest authority, imitating parental traits and accepting parental standards. No man, it is said, can be a hero to his own valet. Parents are always heroes to their own children, until they have themselves destroyed that desirable relationship.

If we overlook the revolts, the moods, the flashes of showy independence, then we can in many ways be of great service to our maturing children. We can be of help in the establishment of work habits and of habits of courtesy and consideration. We can find ways to explain the drama of sex, which can so easily be turned into a tragedy, yet which, when properly observed and respected, is the very foundation of that family life on which our society is based. We can offer cautious advice, which may not be acceptable at the time, but which may be stored for future use. But always we must ourselves be patient, considerate, understanding and forbearing.

Not the least important, we can suggest and perhaps help to find that which every adolescent should have—an adviser, counselor and confidant outside the family circle—an aunt or an uncle, a teacher, a scout leader; one who can serve in an impartial and friendly relationship, entirely free from the disciplinary qualities that often must seem part of the parent's personality. Such a friend will frequently receive confidences that would never have been revealed to any member of the family.

The youth must be helped to acquire, during his youth, fixed and unchangeable standards of behavior and of thought, as permanent as the truth of the Ten Commandments or the principle of the Golden Rule. These may be temporarily obscured but they can never be permanently abolished.

Emerson, in his chapter on "Illusions" from *The Conduct of Life*, pictures the young mortal as entering the hall of the firmament, where every god is sitting on his sphere, he alone, with them alone. Then fall snowstorms of illusions, and he fancies himself in a vast crowd which draws him this way and that, furiously commanding one thing to be done, then another. Every moment there are new changes and new showers of deception to baffle and distract him. "And when, by-and-by, for an instant, the air clears, and the cloud lifts a little, there are the gods still sitting around him on their thrones,—they alone with him alone."

CARE OF THE SKIN

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Green Lights to Health Broadcast, WAAB—March 26, 1941.

The care of the skin is a prime requisite of health. From infancy to old age it is subjected to various insults from our so-called civilized manner of living.

The infant's tender skin requires utmost care. For its daily bath only a mild soap should be used, the skin thoroughly dried and a bland oil applied, followed by a dusting of borated talc on the folds of the skin. Final rinsing of diapers with boric acid solution offsets the alkalinity of the urine, and prevents diaper rash. Overheating of the nursery, over clothing, and irregular or excessive feeding make infants fretful and irritate their skin. When a rash appears a physician should be consulted immediately, for impetigo or eczema may be promptly relieved if treated at the onset.

At the school age the communicable diseases appear. Daily examination of a child's scalp and skin will reveal any contagious disease; daily bath and change of clothing may prevent them. At adolescence acne with its blackheads, oiliness, and pimples makes its appearance and needs treatment. The concept that youth will outgrow this may result in its persistence, with resulting scarring and an inferiority complex which may last throughout adult life. The boy or girl at the high school age desires a clear skin, so treatment should begin as soon as the acne appears. Outdoor exercise, careful diet, regular hours and elimination, with suitable local medication will produce excellent results. Creams and massage should be avoided; the former increase the greasiness, and the latter spreads the infection. Soap and water cannot be used too frequently at this age, except in those adolescents with a dry or eczematous skin.

Adults should become skin conscious at home, at work, and at play. The skin protects us against the onslaughts of the outside world; if abused it rebels with outbursts which may vary from a simple inflammation of the skin, or dermatitis, to cancer. Fatigue, emotional stress, overeating, or overindulgence in alcoholic beverages, and constipation register their effects on the skin. Most cutaneous diseases can be prevented. An intact, soft, pliable skin protects against external irritants and microorganisms, but dryness and the slightest break in its continuity may lead to eczema or infection. Avoid injuries, irritants, and unsuitable clothing. The latter should be light weight, soft, and seasonal. Washable garments should be worn next to the skin and new ones should always be washed to remove the sizing or backfill before wearing, for this sizing may damage the skin.

Concentrated soap mixtures should be thoroughly rinsed from clothing before drying. Too powerful alkalies are harmful and are too frequently used by laundries. Care should be exercised in the choice of soap or soap powders. Medicated soaps are of no value and should be avoided, especially those containing mercury or resorcin. All dermatologists realize that soap and water is invaluable in the care of the skin, but the excessive use of soap and soap powders causes nearly 20% of all the eruptions which appear on the hands. These are not trivial ones, but may last for months or years, are disabling, and often lead to serious infections. The best soaps contain very little free alkali; superfatted soaps such as shaving soaps are to be preferred. Careful drying of the skin is important. When prolonged or frequent exposure to soap and water is necessary, rubber gloves over cotton gloves should be worn and a soothing cream rubbed into the skin at the end of the day's work. Well-advertised lotions often contain glycerin which is drying and not as beneficial as vaseline, lanolin, or cold cream, used either singly or combined.

How about cosmetics? They are mostly harmless; few beneficial. A soothing cream, a bland powder will protect the skin from the dry overheated air of our rooms, the ravages of the wind, dust, and sun. They must be removed with soap and water at the end of the day. In middle age, creams are useful and may prevent dryness and senile changes. Most claims are absurd —wrinkles cannot be eliminated nor can the skin be nourished; these must be corrected from the inside not the outside. Creams containing mercury, such as bleaches, should be avoided. The literature on all cosmetics should be carefully read, for if they contain dangerous ingredients it will be noted on the labels or directions. Face powder should not contain orris root or heavy metals. Perfumes should never be applied to the skin before exposure to the sun, for this may lead to a disfiguring permanent discoloration. Hair dyes and rinses, which are really dyes, are dangerous and eventually cause distressing symptoms. Depilatories may be harmful and deodorants should be used with care. Frequent permanent waving injures the hair; singeing of the hair is a senseless procedure. Lipstick and nail polishes contain sensitizers and may produce eruptions at areas other than the site of application, as for example about the eyes or on the neck.

Speaking of sensitizers recalls the word allergy, which means an altered reactivity; for example, a person reacts unfavorably to a substance which will not affect most people. I believe that every one has his own pet allergy and that about 10% have allergies or hypersensitivities which need medical attention. The substances which cause allergy are called allergens. They are innumerable and cause all types of eruptions—simple swelling of the skin, hives, sores in the mouth, discolorations, painful growths like pimples or boils, dermatitis, eczema and even death. Bromides and sleeping pills are the worst offenders. If a rash occurs while taking a medicine, even aspirin, stop taking it, for drugs are common allergens. If you apply an antiseptic to a cut and it becomes red, blistered and itchy, do not use it again. You are probably hypersensitive to it; consult your physician and tell him what you applied. Allergy can be due to food, pollens, flowers, fungi, cosmetics, clothing, adhesive, industrial contacts, and physical agents such as heat, cold, and sunlight. A sensitivity may develop after years of contact. A woman may use a face powder or cream for years before it will cause a dermatitis. People sensitized to nickel may react to the handling of any nickel-plated object, even safety pins. Everyone should learn to recognize the neighboring poisonous plants, especially poison ivy or oak and primrose. The latter should never be allowed in a house.

Painful feet are disabling and proper care can prevent them. Careful selection of footwear, daily bathing with hot water and baking soda, followed by massage with lanolin will prevent the formation of painful calluses and plantar warts. Careful drying between toes and a borated dusting power is a good preventative of athlete's foot. Its causative factor is a mold or fungus which is found lurking everywhere for the unsuspecting barefoot. Footwear should be worn at all times, on the beaches or in showers.

Any change in the skin demands prompt expert medical advice. An enlargement of an old mole or blemish or the persistence of a new one should suggest malignancy and prompt attention. No one need die of cancer of the skin; it can be cured by early treatment.

THE COMMON COLD

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Green Lights to Health Broadcast, WAAB—January 15, 1941.

What is a cold? A cold is an infection of the nose and throat and sinuses that is caused by a virus. Cold viruses are living organisms too small to be seen by the most powerful microscope. The usual cold is of 5 to 10 days duration. Those lasting longer have usually been complicated by tonsillitis. infection of the ears, sinuses, or glands in the neck, caused by other germs which found conditions right for them to move in and cause trouble.

Trappers off in the woods by themselves in the dead of winter for a month or two at a time never get colds even if they fall through the ice, get thoroughly chilled or tramp about all day in slush and rain soaked to the skin. Let them come out to a settlement to sell their furs and get supplies and they will pick up a cold as quickly as you or I at a football game on a rainy November day. You can't get a cold unless you meet the virus that causes a cold at a time when you are susceptible to it.

Dr. Smillie, formerly of the Harvard School of Public Health, carried out some most interesting studies on respiratory infections in Labrador.

He chose a small community with a relatively stable population, i. e., virtually no contact with the outside world by steamer or dog team for months at a time. Throat cultures were repeatedly taken on all the inhabitants of the village until he had a pretty good idea of the different bacteria present in each person's throat in the community. Any new arrival by boat or dog team was met at the landing-stage by Dr. Smillie or one of his assistants with a welcoming hand and a throat swab. By these studies he was able to show that in a small stable population everybody develops a sort of tolerance or immunity to those germs present in that particular group and after a month or two of isolation from the outside world there are almost no colds, "grippe" or influenza in that community. However, let a trader, missionary, explorer or visitor arrive in the village, if that person is harboring germs different from those already present in the mouths of the local villagers one can predict that within 48 hours an epidemic of respiratory infections will break out and the same organisms can be cultured from every sick person's mouth that were found only in the throat of the apparently healthy visitor just 48 hours before.

The reasons we have such an unending round of colds every winter in any large city are: first, these are not stable communities. People are constantly arriving from other cities bringing with them germs and viruses of every type and description. Secondly, even if the city did have a stable population there is such an infinity of personal contacts, what with school. church, and social gatherings that it would take some years for us all to develop our immunities to all the different infectious organisms always present at any one time in a community of many thousand individuals.

That colds are truly contagious and are handed around from person to person by contact was of course suspected for many years, in fact long before it was discovered just what caused them. Dochez, at the Presbyterian Hospital in New York, a few years ago did some very ingenious experiments which finally conclusively proved the virus nature of the cold germs. He took some washings from the noses and throats of people suffering from what appeared to be typical head colds. These washings he put through some extremely fine filters, filters so fine that not even a particle of matter as big as a bacterium could get through. The clear fluid that came through the filter was then cultured to prove that no bacteria whatever were present. After the cultures were all found to be sterile, the fluid was sprayed into the noses of healthy chimpanzees. In 12 to 24 hours the previously healthy monkeys began to sneeze and had running noses and elevations of temperature just like anyone else with a cold. Dochez later repeated this experiment on healthy human volunteers with exactly the same result.

It was a beautifully executed experiment most carefully done and has been accepted by the scientific world as proving that the common cold is caused by an invisible filtrable virus.

An old epitaph in a New England Cemetery reads as follows:

"Here lies our wife Samantha Proctor
She ketched a cold and wouldn't doctor
She couldn't stay she had to go
Praise God from whom all blessings flow."

I trust that there are few who regard colds in quite the above manner. Most of us nowadays look on colds in one of two ways. (1) A necessary evil of civilization which doesn't do much harm and runs its course pretty independently and entirely uninfluenced by any effort made to combat it. Those people usually continue at their work and rarely get a cold severe enough to cause any loss of time from work. (2) The other group I referred to look on head colds as a dreadful calamity, take to their beds at once, call their physician, gargle and dose themselves with a dozen different household remedies, spend three or four days in bed and get back to work in a week very little the worse for either the cold, the four days rest in bed or the flock of remedies they took to hasten their recovery.

What is wrong with both these attitudes? The first one I believe is wrong for two reasons. First, these people spread their colds to all their business and social contacts, and secondly a rare one of them will develop pneumonia, perhaps, spending several weeks in the hospital and several more weeks convalescing. There are also occasional other unfortunate results from a neglected cold such as chronic sinus trouble, abscesses in the ears, and swollen glands in the neck just to mention a few of the commoner ones.

The second attitude is more sound to my way of thinking though I did exaggerate it a bit. The important thing is that a cold left to itself is a short self-limited disease which will get well of itself if nothing whatever is done about it except going to bed and getting well rested. I know of no medicine which will in any way hasten recovery.

There are, of course, several medicines which will make one more comfortable while waiting for the cold to take itself off. Aspirin will certainly make an aching back and head easier to put up with. Parenthetically may I point out that aspirin should cost you 50 cents for 100, or 75 cents for 200 tablets, in case you have been paying more for some special brand which is identical except for the name.

Almost any cough medicine will improve one's night's rest if one has an irritating cough that keeps one awake. Steam kettles and sleeping in a warm room seem to benefit people with laryngitis. Watery nose drops, sprays or benzedrine inhalers will often temporarily clear up a stuffed-up nose. But all these tricks to make people more comfortable are as nothing if the person won't go to bed and let the cold take care of itself.

A little more about nose drops. Most children under three bitterly resent being held upside down while mother puts some unpleasant smelling, pungent, sometimes even painful, drops up their noses. In fact most of them struggle violently, weep considerably, get red in the face and are more choked up when you get through than when you began. Do you suppose that helps very much? If on the other hand you have a very bland nonirritating watery solution, some children apparently rather enjoy the attention and if they don't get all stirred up it probably does make them feel considerably better and conceivably lessens the chance of infection going into their ears and sinuses.

As a matter of fact oily nose drops have been shown to be actually dangerous in very small or struggling babies as the oil may get sucked down into the lungs and actually cause a pneumonia which may be fatal.

If nose drops are given it is a good plan to give them before meals and at bed time as a child will eat better and sleep better if his nose isn't all blocked up. At bed time it also sometimes helps a child's breathing if you place one or two books under the head of the bed to raise it up a little. Two large pillows under one's head will do the same thing for an adult.

With older children and adults a benzedrine inhaler is often useful. This is a little metal tube (probably familiar to most of you) which contains a rather pleasant smelling volatile substance which can be sniffed at intervals during the day with very little inconvenience to child, mother or rest of the household. If used too frequently a benzedrine inhaler may keep a person awake so it is well to caution a person not to use it more than five times in 24 hours.

Now what about the prevention of colds? How about cold injections, cold capsules or fancy diets?

A few years ago a group of doctors in the University of Minnesota decided to study the value of cold vaccines taken by injection or by mouth, so they chose 4 groups of approximately 500 students each who agreed to cooperate. One group got injections of cold vaccine, a second got injections of sterile salt solution, a third got capsules of cold vaccine to take by mouth and the fourth got capsules containing milk sugar. None of the students or the doctors actually giving the injections or the capsules knew which medicine was being given to any individual student until after the experiment was all over. Much to the astonishment of the investigators there was a striking reduction of the number of colds each winter in all four groups. The conclusions drawn from this experiment were that cold vaccines are of little more value than injections of saline solution in the prevention of colds and vaccines taken by mouth are of no more value than milk sugar capsules taken by mouth. But this is most important, anybody who is willing to take the trouble to take any form of medicine regularly throughout the winter stands a good chance of having 70 per cent fewer colds! The probable explanation for this rather surprising result is that anyone willing to go to the bother or expense of taking cold capsules or injections will also probably take better care of himself in order to make his investment pay. Vaccines and cold capsules usually contain killed bacteria or products from killed bacteria. The hope is that taking these substances will build up an immunity to those organisms. Unfortunately no cold vaccine has yet been produced which contains the actual virus which causes colds so it really isn't so surprising that these vaccines are not of very great value.

What about "cold pills," "grippe capsules," or "cold cures" to take after the cold has begun? I believe that all these much-vaunted remedies are absolutely without merit as far as terminating or averting the cold if one does not go to bed and get rested. If one does go to bed and get rested these remedies are of definite value in making one feel better while the cold is curing itself. Most of those cold remedies are quite harmless but unfortunately some are actually dangerous. In the January 27, 1940, number of the *Journal of the American Medical Association* is a report of two serious cases of jaundice which followed taking a drug called "cold cure." One of the two cases, a ten-year-old boy, died from his jaundice. Whenever you buy patent medicines you are running the chance of getting something actually harmful because many of these companies are utterly unscrupulous as well as unscientific.

Secret remedies should be avoided as no reputable physician refuses to tell the nature of the medicine he is using, but on the contrary if one discovers some new effective medicine he is only too eager to publish his discovery in medical journals and get the credit for the advancement of knowledge in the war on disease.

What about the old New England "cold cure," a rum toddy or good stiff drink of whiskey? I am very much in favor of this remedy with one proviso: the person taking the cold cure must stay at home and go to bed. Entirely too often what happens is that after a stiff drink of whiskey our patient feels so very much better he then decides he feels well enough to go out to dinner and dance or to the movies, so returns home at midnight or later feeling ever so much worse than before he took his cold cure and having exposed all his friends to his cold.

How about vitamin preparations in the prevention of colds? Up to the present time there has been no convincing evidence that any one combination of vitamins is of the least use in the prevention of colds. On the other hand it seems like common sense to make certain that the body is getting an adequate supply of all the vitamins and it certainly will do no harm. Don't expect too much of the vitamins but continue to practice the usual common sense precautions.

As to diets, there has never been any scientific evidence brought forth that any diet has the least effect in the prevention of colds. If people have adhered to some unusual form of diet and have felt that they have had fewer colds as a result of it, it can probably be explained in the same way as those in the experiments who received definite benefit from cold vaccines, cold capsules, sugar capsules and injections of plain salt water.

Perhaps here I might mention the old adage about starving a cold and feeding a fever. The only trouble with this adage is that I find some people say it goes "starve a cold and feed a fever," whereas other equally able historians say "If you starve a cold you will have to feed a fever," which rather reverses the meaning. Anyway, whatever our ancestors believed on this matter the general feeling today is that in the presence of any acute respiratory illness, whether or not fever is present, it is wise not to overload the stomach or to try to force a person to eat who has no appetite.

Hot drinks such as bouillon, cocoa, tea, coffee, or lemonade do seem to have a pleasant effect on raw throats. On the other hand if the invalid begs for steak and onions and really wants them, the chances are he will digest them satisfactorily and enjoy the privilege of having what he really wants. Also, it seems unwise to try to set the invalid's back teeth afloat on the faint possibility that the cold will be washed out with the water. Fruit juices are a pleasant way of getting a small amount of nourishment into a sick person who hasn't much appetite. Also it replaces fluid and salts lost by perspiration if the person is running a fever. One comes back irresistably to the old Greek idea of moderation in all things being the best guide to the diet for the person in bed with a cold.

To sum up, then, I know of no method of preventing colds except the age old common sense rules of *avoiding* getting all tired out, going about with wet feet and going out of doors improperly clothed at any time of year, and kissing someone with a cold.

My advice to you is if in spite of exemplary behavior you have got a cold coming on for goodness' sake don't go to a football game, a hockey game, a cocktail party, a dinner party or a meeting of business associates but go to bed and stay there until the cold is over. Anybody from age one to age 100 who has a temperature above normal and a cold coming on belongs in bed for their own sake and especially for the benefit of others.

WHAT IS A VIRUS?

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Green Lights to Health Broadcast, WAAB—April 23, 1941.

Many of you who are amateur gardeners have spent evenings and week ends planting bulbs and seeds, and watching for the first green shoots which promised later rewards in blossoms and fruits. To some it may seem a far cry from plants to the subject—"What is a Virus?" But actually it is not. The first virus to be discovered was found in the tobacco plant almost fifty years ago by a Russian botanist named Ivanovski. Many other plants in addition to the tobacco plant also are affected by viruses. Most of you have probably seen and admired the colors and patterns in certain variegated tulips, but how many of you knew that these colors and patterns were due to a disease of the tulip plant caused by a virus?

But not only plants are affected by virus diseases. Almost every form of life has its own virus diseases—insects, fish, birds, animals and man. Even the germs, or bacteria, such as the streptococcus which causes blood poisoning and the staphylococcus which causes boils, suffer from virus diseases. We call these viruses "bacteriophages"—meaning "eaters of bacteria."

Most of these viruses do a great deal of harm. They are truly "enemies of life." For example, in Louisiana alone, nearly $6,000,000 worth of sugar cane was lost yearly due to a virus disease; in Europe in one year 329,000 cattle were destroyed by foot-and-mouth disease, due to a virus, and the great epidemic of influenza in 1918-19 killed more people than were lost in the entire 4½ years of the first World War.

And now perhaps you are wondering: What is the meaning of this word "virus"? How is a virus recognized? What is the nature of a virus? What other diseases are caused by viruses? Why should I know about them and the diseases they produce?

The word "virus" literally means "poison," and it was first used in medicine to include any unknown agent which was harmful to the body or which produced disease. With the discovery of the microscope, however, many of these agents were made visible and were then given other, more specific names, such as the tubercle bacillus, the germ which causes tuberculosis, or the ameba which causes one kind of diarrhea or dysentery. Gradually the meaning of the word "virus" has been limited to certain disease-producing agents which are so much smaller than other germs that most of them cannot be seen with the ordinary microscope. In fact, some of them are so small that they are not much larger than a single molecule of a protein, such as egg white. The virus which causes infantile paralysis, for example, is about one three-millionth of an inch in diameter, and it would take billions of such particles to cover the head of a common pin.

A second property distinguishes viruses from other germs, and that is their ability to grow only in the living body cells of the plants or animals which they attack. They will not grow in the lifeless food, such as meat broth, which we use to cultivate the larger and, for the most part, less fastidious germs. It is necessary, therefore, to grow living calls in the test tube, in order that the viruses may obtain their food from these cells, and thus grow or reproduce themselves.

How, then, do we know that they exist? Here we have to depend upon their effects. We recognize them by what they do. The human eye cannot see radio waves even with the most powerful magnifying glasses, yet we know they exist, because with the proper instruments they can be converted into sound. Electricity cannot be seen, yet when it flows through the tiny wire in an electric light bulb we recognize it by the heat and light which are produced. Just as we can measure the amount, the rate of flow, and the effect of electricity by the proper instruments, so can we measure the amount, the rate of multiplication, and the effect of viruses by studying the living cells which they attack. Some viruses kill the cells, others cause the cells to multiply abnormally, and still others cause characteristic changes in the structure and appearance of the cells. By special procedures even the size of these tiny virus particles can be measured.

The nature or composition of viruses is much more difficult to determine, and in many instances is still unknown because, for the most part, the virus agents occur in small quantities and are difficult to isolate and to analyze. Fortunately this is not the case with all of them. The virus which causes mosaic disease of the tobacco plant occurs in large amounts in diseased plants. Just six years ago this agent was purified and was found to be a protein substance similar, for example, to egg white. Since then other plant viruses have been isolated and long strides have been made toward determining the nature of animal and human viruses.

What are some of the diseases caused by viruses? We have already mentioned two diseases in plants—the "tulip-break" and mosaic disease of tobacco. A few of the others are: mosaic disease of sugar cane, leaf roll of potato, aster yellows, and curly-top of sugar beets. Insects also have their own virus diseases—sacbrood of honey bees, and the "polyhedral" disease of silkworms—to mention only two of considerable economic importance.

You are undoubtedly acquainted with many of the virus diseases of animals, some of which may also affect humans: cowpox or vaccinia, which is used to vaccinate human beings against smallpox; foot-and-mouth disease of cattle; swinepox; a "sleeping sickness" of horses called equine encephalomyelitis, an epidemic of which occurred in Massachusetts during the summer of 1938; rabies or hydrophobia of dogs; dog distemper, and many others.

Birds, too, are affected, with fowl pox, fowl plague, "parrot fever" or psittacosis, and certain tumors in chickens.

In man the list is long and varied, and includes such minor afflictions as "cold sores" or "fever blisters," as well as very severe killers like the epidemic influenza of 1918-19. Others are familiar to you all: measles, chicken pox, mumps, the common cold, warts, smallpox, infantile paralysis, sleeping sickness, and so forth.

Thus you can see that these diseases are widespread throughout the animal and vegetable kingdoms. You should know something about them, not only because of their economic importance, but also because they may bring illness, loss of health and even of life to you and to your families. The agents which cause these diseases are invisible, but they are not as mysterious as was once thought. They can be and are being studied in research laboratories and great advancements in our knowledge are resulting. It is important that you realize this fact, so that you may better understand the measures which your doctor uses to prevent and to cure these conditions.

And now, more specifically, what are some of these measures which protect against or cure these diseases and what should you do about them? In the first place, you should keep yourself in good condition by eating nourishing foods, exercising, and getting an adequate amount of sleep at night. See your doctor for an annual checkup. He can then correct any ailments while they are still minor and can give you many suggestions to help you stay in good condition and keep your resistance at a high level.

Secondly, see to it that your children, as well as yourselves, are vaccinated against smallpox. This deadly disease was the first for which vaccination was successful. The method was discovered by Jenner in England about the time of our Revolutionary War. The awful plagues of smallpox have not occurred since that time. But every year, and particularly during the stress of war, unvaccinated people needlessly die from smallpox. It is so easy to prevent by vaccination, but unfortunately so difficult to cure!

Special vaccines have been developed against other virus diseases as well, both for humans and animals, against yellow fever, sleeping sickness of horses, hydrophobia of dogs, and dog distemper, to name only a few. Hydrophobia in humans, which may result from the bite of a mad dog, can be prevented by injections. Recently a special vaccine has been tried against influenza. This one is still in the experimental stage, but we all hope that in the near future this dread enemy can be conquered.

Thirdly, certain of these diseases are spread by insects—mosquitoes, ticks, fleas, and so forth. Much can be done by eradicating these vermin and destroying the stagnant pools where mosquitoes breed.

And finally, if you or one of your family contracts one of these diseases, call your doctor immediately. In the early stages, some of these illnesses, such as measles, can be made much less severe and serious, by the use of serums. Many of these diseases, chicken pox, mumps, and even influenza, for example, may be in themselves mild illnesses, but become serious by the development of ear infections or pneumonia due to the germs already present in the nose and throat. Your doctor will recognize the early stages of such complications, and can prevent deafness, prolonged illness, or even death by the use of his medicines, such as special drugs or serums.

INFANTILE PARALYSIS

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Green Lights to Health Broadcast, WAAB—April 30, 1941.

Almost every summer, when infantile paralysis breaks out in some section of the country, there is an extraordinary degree of apprehension. This is not so much because of the large number of cases, as compared with epidemics of other diseases, but because of the fear of paralysis. Then, too, the unexpectedness with which the disease strikes and the uncertainty as to where it will appear add to the alarm. This feeling of helplessness is responsible for a pressing demand for more knowledge about the disease. As a result, infantile paralysis has been studied much more closely than many of the far more common diseases occurring all the time, and to which we seem to become more accustomed.

In many diseases, the cause is quite apparent from some one striking circumstance—the connection with the sick parrot in psittacosis, with the dogbite in rabies, exposure to a case in smallpox or measles, or to the carrier in typhoid. But in infantile paralysis, no one circumstance immediately tells us which way to turn in attacking the problem. Any theory becomes a subject of study. Through the years, there have accumulated a great variety of seemingly contradictory findings. Moreover, the clinical disease is sparsely distributed and the available tools to study it in the laboratory are so restricted that most often studies in the field or experiments in the laboratory have been limited to such small numbers that it has been difficult quickly to recognize the important or to rule out the unsound theories. Since it is difficult to discriminate between observations which are important and those which are not, it is not easy to harmonize the various findings into a convincing concept. The result has been that we find all sorts of conflicting hypotheses, often based on small bits of evidence, and with seeming preference for those which have a more hopeful sound or which match in oddness the vagaries of the paralytic disease. If, instead of forming a new theory every time a new bit of evidence is collected, the many pieces of evidence be fitted together like the jigsaw puzzle, we can begin to see a picture that could hardly be imagined from even the closest examination of the pieces separately. From the maze of collected studies, a few facts stand out clearly, facts which could not be discovered from the study of individual cases or epidemics, or from any one experiment.

The dissemination of the virus which causes infantile paralysis far exceeds the occurrence of the frank disease. Evidence that the virus is generally and rather uniformly widespread is seen in the geographic prevalence of the disease—we find it all over the globe; in the difference in the ages at which it occurs in city and country populations; and the finding that many persons become immunized who have never had any symptoms of the disease at all. In striking contrast, the occurrence of the paralytic disease is restricted to a small fraction of those exposed to the virus.

Many who come in contact with the virus show no symptoms at all. More of the milder forms of the disease are now being recognized, so that a diagnosis of infantile paralysis no longer means, as it did a few years ago, inevitable paralysis. And we are beginning to ask ourselves when we see these primary symptoms: will this be infantile paralysis, or is it merely a harmless infection with its virus, trivial in itself, but taking its full part in passing the virus along and keeping it in circulation?

Now that we understand that this virus, which is so widespread—perhaps as widespread as measles—is harmless to the vast majority of people, we might do well not to concentrate all our efforts toward the probably impossible task of keeping it from spreading, but rather to study the circumstances which, in addition to exposure to the virus, make for the occurrence of paralysis in the exceptional few of those exposed to the virus. There are reasons for believing that a difference in those exposed, rather than any difference in exposure, determines whether or not paralysis will occur. Paralysis picks not just any who are exposed, but a certain few. Some of these selectivities may give a clue as to the cause of this susceptibility to paralysis, and this would appear to be one of the most important things to learn about the disease, because paralysis is the one serious consequence of infection with this virus.

What are these selections which govern paralysis? The frequency of paralysis in those exposed varies in different climates, and also with season in the same locality. There are many persons who are exposed without having the recognizable disease in regions nearer the equator, and the same is true also in off seasons in temperate zones where infantile paralysis is more common. This influence of climate and season on the prevalence of the disease suggests that some physiologic process which fluctuates with climate and season has some bearing upon the response of persons to exposure to the virus.

A second reason for believing that some factor in the individual determines the development of the disease upon exposure to the virus is its tendency to occur in multiple numbers in some families, not only in brothers and sisters, but in members of successive generations, and in both lineal and collateral lines. This familial frequency is out of proportion to the low incidence of the disease in the general population, and suggests that susceptibility is in some way associated with some inherited quality.

That the disease tends to occur in those of a certain constitutional type has long been suspected by those who see many patients with the disease. The observation, while by no means universal, has nonetheless been made often enough to suggest that youngsters, whose glandular functions regulating growth and development are in some way modified, are more susceptible to paralysis than others.

Again, the virus of infantile paralysis evidently enters the system through the mucous membrane of the upper respiratory tract, and this mucous membrane, when sound, probably is the barrier which prevents the virus from reaching the nervous system. A number of cases of paralysis have followed tonsil and adenoid operations, and this bears out the idea that injury to mucous membranes may let the virus through to the nervous system.

Moreover, there is an impression that infantile paralysis occurs more often than would be expected on the laws of chance in persons at certain times, when there are known changes in mucous membrane due to changes in hormone secretion. These naturally occurring changes have been reproduced experimentally in monkeys. When these animals are given instillations of the virus in their nostrils, their resistance is seen to be different from that of normal animals. In addition to these experiments, it has been found that individuals who have had infantile paralysis have different glandular secretions as compared with other children who have not had the disease.

Thus, from all of these studies, we may say that the exceptional occurrence of paralytic infantile paralysis, among the many who are exposed to the virus, is determined by individual susceptibility which is physiologic in nature and bound up with differences in certain of the endocrine glands. We have in infantile paralysis, therefore, not a simple problem of a disease to which we can apply universal preventive measures—such as smallpox, in which we can vaccinate everybody; or, on the other hand, as rabies, where we can readily select the few who need vaccination—those bitten by a rabid animal. From the point of view of paralysis, infantile paralysis is a disease of limited occurrence, and close attention must be paid to its behavior when considering the practicability of preventive measures.

I notice that these papers are called "Green Lights to Health." The "green light" in infantile paralysis would now seem to be in the direction of studying the question of susceptibility, in order to be able to pick out the few who are susceptible, to try to understand what makes them susceptible, and to learn how to correct their susceptibility in the hope of turning what is for them a distressing disease into what is for most people a harmless immunizing infection. For it may not be feasible to adopt too sweeping or drastic measures for the benefit of a few of the many who are exposed to the virus.

Now that knowledge has extended to the milder infections with this virus we can take some comfort, if an epidemic appears, when we remember that over one-half of the cases diagnosed do not develop paralysis at all; that probably one-half of those who do develop paralysis recover entirely; and that many of those are so slightly affected that they are not at all handicapped in following any of the ordinary pursuits of life.

PREVENTIVE MEASURES IN ORTHOPEDIC SURGERY

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Green Lights to Health Broadcast, WAAB—January 8, 1941.

Orthopedic conditions refer to disturbances of the bones, joints, muscles, and nervous system that interfere with normal sitting, standing, walking, running or more vigorous activity. Briefly, these fall into three classes which may be described as (1) postural disturbances, (2) congenital abnormalities or those starting before birth, (3) acquired, or those conditions which appear after birth.

Many orthopedic problems seen in the adult can be traced to disorders that existed in childhood. Painful feet, backaches, and postural disturbances are a few examples. If these conditions can be approached at the earliest possible age, the incidence in adult life will be greatly reduced.

Rickets is a conspicuous example of a deforming disease, which has been largely controlled by preventive measures. The bowlegs, knock-knees, deformed skulls and distortions of the spine so commonly seen a few years ago, as the result of rickets, are becoming rare today. The disappearance of these deformities was first accomplished by balancing the diet of the child, thus insuring an adequate amount of minerals and Vitamin D. This step in the prevention of rickets was carried still further by protecting the unborn child through an adequately balanced and fortified diet in the pregnant mother. With this care given prospective mothers, children are born with healthy and efficient muscle and skeletal systems. The practice of these preventive measures also offers excellent dividends in general health, for besides the bony and postural disturbances seen in rickets there are other signs of poor health which rickets brings to the small child. Marked anemia, gastrointestinal disturbances, irritability, and poor resistance to infections of the respiratory tract are outstanding complications which accompany this deficiency disease, a disease which now may be classified as preventable.

There are other less spectacular disturbances of body mechanics which are important because they, too, represent deficiencies which affect general health.

Let me cite an example of a child with poorly balanced feet, knock-knees, a prominent abdomen, a flat chest, and a forward head. Here is a child with a skeletal system that is badly supported by its muscles and ligaments. A condition which is described as faulty posture or poor body mechanics. When an orthopedic surgeon is asked to correct such faulty posture as this, he must seek and outline correction for the causes of these troubles before correcting the obvious or visible mechanical defects. Thoughts first turn to a check of the child's existing nutritional state. Poor nutrition, if it exists, may be caused by fatigue, overstimulation, foci of infection, or food inadequate in quality or quantity. Disease, therefore, may be one factor in the problem, but is not the only cause of disturbances of the mechanics of the body. It is impressive how frequently hygiene, especially of rest and diet, must be linked with mechanical aids in the plan for complete correction of the commonest orthopedic conditions.

The modern approach to the treatment of faulty posture in childhood, then, consists of giving the child a complete physical examination including important laboratory tests, a consideration of the daily program of the child's activities, and a careful review of the food he eats. The final recommendations for his care are determined by the findings of this thorough study and include corrections that will meet his individual needs. The needs vary, of course, with each child. If the study reveals poor hygiene, correction of this must be combined with special orthopedic recommendations, such as foot supports, corrective shoes, back supports, and exercises.

Now, let us consider some of the congenital orthopedic conditions which are amenable to early care. Here again, *early* care is stressed as the means of preventing deformities and disabilities in later life. The clubfoot, wryneck, dislocated hip, and structural curvatures of the spine are a few examples of a long list of disturbances which are congenital, that is, present at birth. The principle of treatment is the same in all of these cases; namely, the earliest possible approach to the correction of the deformity, consistent with the baby's general health. The orthopedic surgeon has learned from experience that the flexible and plastic nature of the newborn's structures yield to mechanical corrections more rapidly than in later life. An untreated deformity grows worse very rapidly in infancy and early childhood. Unfortunately, all congenial conditions are not presented for treatment in the first weeks of an infant's life, either because our diaganostic methods are not adequate or because the child's general condition will not permit it. However, in the case of the congenital clubfoot, we have a deformity which is obvious at birth and which tolerates early treatment most satisfactorily. In this condition, the orthopedic surgeon, knowing that the deformity was present many months before the birth of the child, starts corrective measures at once in order to stop the deforming factors. I need not go into the methods of clubfoot treatment at this time, but I would like to say that treatment started at birth allows the child to have correct feet at a very early age in his life, so early that he may walk satisfactorily at the expected age and have no memory of his original deformity.

The values of preventive measures and early treatment may also be demonstrated in many acquired orthopedic conditions—infantile paralysis, arthritis, birth injuries to nerves, bones and muscles, and the large number of cases that are due to automobile, street, and household accidents.

In infantile paralysis, for instance, the doctor makes early use of protective apparatus such as splints, plaster of Paris casts, or braces to prevent contractures of unparalyzed muscles and to rest the involved or paralyzed group. These measures enhance recovery and in many cases prevent later surgery.

The arthritic individual, too, besides receiving general treatment, is protected with similar forms of apparatus to prevent changes in the bones, joints, and muscles.

A child with a birth injury to muscle, bone, or nerve is also treated with these mechanical aids to rest the injured part and to prevent deformities that develop secondarily from the unequal pull of strong muscles.

Victims of accident from whatever cause must be handled by a person who understands the structures and functions of the tissues of the body. Broken bones, and torn soft structures like muscles, ligaments, nerves, and blood vessels, must be protected in apparatus that will avoid further damage to the already injured tissues. Careful handling at the time of the injury and the application of a protective apparatus such as a splint, brace, or sling will insure comfort, early healing, and prevent the serious complications that might otherwise be disabling.

A very common problem that comes to the orthopedic surgeon is the one referred to as "foot troubles." Is it possible to avoid the many painful and disabling foot conditions? Yes, it is. A foot is a very complicated mechanism consisting of twenty-six bones, supported by ligaments and moved by muscles. It is dependent upon the circulatory system for its nourishment and on the nervous system for its control. This combined structure is protected by the skin, nails, and subcutaneous tissue, or tissue which lies just beneath the skin. There are two arches in the foot, the longitudinal or the long arch, and the transverse or the front arch. These arches are present in the newborn. The height of the arches varies with the individual and it is not an index of foot strength or efficiency. Highly arched feet are often weak and painful, while a low arch may be strong and useful. Feet are as individual as faces and it is unwise to standardize the treatment of foot disorders or to prescribe a shoe that will meet all needs. Each foot deserves the care that its individual differences call for.

A normal foot, one containing good structures, is well adapted for standing or walking and responds to changes in activity easily and comfortably. Interference with or restriction of the function of a normal foot will result in different types of disturbances and deformities. An example of an extreme or planned deformity is represented by the Chinese Mandarin's foot. This distortion of foot structure is the result of binding the flexible, plastic foot of the child until it presents the desired shape. Such a misguided esthetic sense is fortunately disappearing. Malvina Hoffman in her excellent book called *Heads and Tales* gives splendid illustrations of such feet. To a less marked degree some of our modern shoes, by unwise use, distort the structures of the foot and interfere with free circulation, comfort, and useful function.

Normal development of the bones and muscles is encouraged by free activity. In the newborn, it consists of kicking, which is natural and unrestricted; later, by crawling about, and later still by the sequence of standing, walking, running, jumping, and climbing.

The shoe is first used during the crawling stage as a covering to protect the foot from cold and from the irritation of floor surfaces. For this purpose, any soft shoe serves very well.

When the child is old enough to stand and walk, the shoe is both protective and supportive. Assuming that the child will have to walk on hard surfaces, his shoe will best consist of leather with a hard sole. The height of the heel will depend upon the type of the foot the child possesses. Some children need to have an additional lift added to the heel because the manufactured heel may be too low to provide for the proper foot posture. Other feet require the tilting of the heel, that is, making one side of the heel higher in order to balance the foot. A foot support inside the shoe is very often used to protect structures from strain and to distribute the weight of the foot more efficiently. No two pair of feet are alike. Since the average shoe is made for the so-called average foot, you can see why individual modifications are so necessary.

During the growing years, it is essential to change shoes frequently to accommodate for growth. Short, tight shoes on flexible, growing feet cause deformities quickly.

In the adult the problem is less complicated because the structures in the foot are fixed, growth has stopped and the foot has reached its maximum size. If an adult has had intelligent care during his growing years, he will arrive at adult life with healthy, useful feet. The maintenance of this healthy state of his feet depends upon the practice of good general care of the body. This means proper diet for good nutrition of his tissues and a reasonable distribution of work, exercise, rest, and a selection of shoes to meet his individual needs. A distinction is made between the working or active shoe and the dress shoe or off-duty shoe. The working shoe is the important one because it is worn more hours each day than either sport or dress shoes. This work shoe must be long and wide enough to allow for forward and lateral spread of the foot in walking and standing. The sole of the shoe should consist of firm leather, thick enough to absorb the shocks of the hard, resistant walking surface. The shank of the shoe must be high enough to accommodate the longitudinal arch and is more supportive when it is rigid. The heel is a very important part of the shoe. Here again, the height of the heel must be determined by the character of the individual foot structures. A tight heel cord, for instance, calls for a shoe with a higher heel than a foot with a relaxed heel cord. The right kind of heel is selected after considering the requirements of each foot.

Proper hygiene of the foot includes exercises which should be performed without anything on the feet. The purpose of these exercises is to strengthen those structures of the foot which are handicapped in a shoe, and it must be remembered that the shoe at best is an artificial device.

Although on many occasions the orthopedic surgeon must use his trained technique to repair by surgery structures which have become disabled through accident, disease or neglect, orthopedic surgery shares with all branches of medicine the high aim of prevention of disease and the maintenance of optimum health.

THE DISEASE THAT KILLS THE FEWEST AND CRIPPLES THE MOST

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Green Lights to Health Broadcast, WAAB—December 4, 1940.

Q. Doctor, will you tell us why you chose the title, "The Disease that Kills the Fewest and Cripples the Most"?

A. Yes, I will. A short review of certain facts recently discovered by our State Department of Public Health will answer this question. Massachusetts was the first state to discover that a disease called chronic rheumatism or chronic arthritis is responsible for more suffering and crippling than any other chronic disease. In this state, there are more people suffering from chronic rheumatism than there are individuals suffering from tuberculosis, cancer, heart disease and diabetes combined. Our State Department of Public Health has discovered that there are 140,000 people in this state suffering from chronic rheumatism. Six thousand of these individuals are so badly crippled that they are forced to lead a bed and chair existence. In other words, a disease called chronic rheumatism or chronic arthritis cripples thousands of individuals but rarely kills them. This is the thing that makes it so hard on families and so important to the State.

Q. Is chronic rheumatism a new disease, Doctor?

A. No, chronic rheumatism has been known for 8,000 years. The Egyptian mummies bear the telltale evidence of its existence at that time.

Q. Doctor, does chronic rheumatism occur more frequently in any particular climate, race or social group?

A. Yes, chronic rheumatism is more common in the temperate zones, such as New England, than it is in the tropics. It occurs less frequently among the Eskimos and American Indians. Nevertheless, we can say that chronic rheumatism spares no race, age, sex or social group. Although more common in temperate climates, the tropics are not without it, and occasionally Eskimos and Indians get it.

Q. Is there any difference, Doctor, between the terms, chronic rheumatism and chronic arthritis?

A. I should say that for all practical purposes there is none. The term, rheumatism, includes all diseases capable of causing inflammation of muscles, sinews, and joints, whereas the term, arthritis, refers to any disease affecting the joints or the ligaments about them. For example, one individual may have severe rheumatism of the muscles and yet have no trouble with any of his joints. Another individual may suffer from a disease which causes inflammation of both the muscles and the joints. Sometimes muscular rheumatism is the first symptom of a chronic arthritis.

Q. From what you have just said, Doctor, I would infer that there is more than one type of chronic rheumatism. Is this correct?

A. Yes, there are many forms of chronic rheumatism but certain forms are more serious than others because they may cause more crippling. In certain instances we know the exact cause and in others we do not.

Q. Is any one type more common than any other, Doctor?

A. Yes, there are two types which are most often met. One is called hypertrophic arthritis or degenerative joint disease and the other is called rheumatoid or atrophic arthritis. The first type called hypertrophic arthritis or degenerative joint disease affects chiefly older people. All older people have it in some form though they themselves may not know it. In fact, only a small percentage of people affected with this type of arthritis have severe pain. What they most commonly complain of is stiffness and aching in the joints, most frequently in the finger joints nearest the nails and in the knees and hips. These symptoms often come and go. They may be present for weeks or months and absent for as long or longer periods of time. This type of arthritis is responsible for the bony enlargement and disfigurement seen in the last joint of the fingers. Although this form of arthritis is capable of producing ugly-appearing and at times distorted finger joints, it is almost never responsible for progressive crippling except when it gets into the hips or the knees. In these joints, the spurs of bone that develop may grow large enough to cause not only pain with each step but also seriously interfere with the motion of the joint. In this type of joint disease, the changes responsible for the joint disability take place in the cartilage or gristle covering the ends of the bones. Because of its poor blood supply, gristle, if it is injured, has much more difficulty in healing than does the skin. Because of the added stress and strain on these damaged joints, the edges of the joints become overgrown. These gristle overgrowths or spurs change into bone and can be easily seen in X-rays. The more work and strain a joint has to stand, the greater these changes will be.

Much can be done for this type of joint disease. The most important thing to be remembered is that it does not lead to progressive crippling and invalidism. Keeping your weight down, giving support to the afflicted joints, and applying heat will do much to make these joints more comfortable and prevent them from growing worse. I do not think that removal of teeth, tonsils or other focal infections, or giving vaccines to these sufferers does much good in this type of arthritis.

Q. How about the other type you spoke of, Doctor?

A. Yes, I was just about to tell you about that. Rheumatoid or atrophic arthritis is quite a different story. It is responsible for most of the crippling and invalidism. It affects all age groups, but unfortunately, more often the wage-earning group. For some reason, women are more often affected by this type than men. It may come on suddenly, but more often slowly. It may first amount to simple aches and pains; later there is swelling and pain in a few or many joints. Patients with this type of arthritis complain of general as well as joint symptoms, such as loss of pep, weakness, fatigue, loss of weight, slight fever, etc. Joints affected with this type of arthritis become stiff, crippled, and deformed unless the progress of the disease is stopped. In such joints, the first change occurs in the smooth lining of the joint. The disease causes the smooth lining membrane to grow, giving it the appearance of rough, raw flesh. As it continues to grow, it may completely envelop the gristle-covered ends of the bones which make up the joint. The thick overgrown membrane tends to stick to whatever it can and if nature or the doctor doesn't stop the disease, the entire joint will eventually freeze and become stiff. We encourage motion in this joint in order to prevent such sticking from taking place. If not arrested, this type of arthritis progresses from joint to joint. If this is allowed to go on, the patient may become bedridden.

The exact cause of this type of arthritis is not always discoverable, yet much can be done to arrest or cure the disease. As in tuberculosis, so, too, in rheumatoid arthritis the most important curative measures are general ones, such as rest, a high vitamin diet, sunshine, joint and body exercises. There may be some trouble with the kidneys or bowels or lungs as well as with the joints. It is necessary to set these right as well as the joints.

The whole woman or man should be treated and not the joints alone. All too frequently the person with this type of arthritis refuses to go to bed or to take the necessary amount of rest. Yet such general measures are just as important in this disease as in the case of tuberculosis. Unless patients are willing to carry out such treatment, they cannot obtain as happy results as they should. A patient with this type of arthritis should never rely solely on some one single measure such as having a tooth pulled or having injections given him. The general measures should always be insisted upon and followed.

Q. Doctor, can arthritis be cured?

A. Yes, many of the types of arthritis of known cause can be cured. Some of the unknown types can be cured, others arrested, and most of them improved. The sooner the patient seeks treatment the more can be accomplished. This is true of all types.

Q. What should a person do, Doctor, if he suspects that he has arthritis?

A. He should report to his doctor at once. The doctor's first duty is to determine whether the aches and pains complained of are or are not due to arthritis. If they are, his next duty is to determine from what type of arthritis the patient is suffering. Having found this out, the doctor can prescribe the right form of treatment. By going about it in this manner, patients are not subjected to useless, unnecessary and oftentimes expensive treatment. If your physician is not interested in arthritis, ask him to refer you to a doctor who is, or if you cannot afford to have a private physician treat you, ask him to refer you to a hospital in which there is a special clinic for arthritis.

Q. Doctor, is our State Department of Public Health interested in arthritis?

A. Yes.

Q. What are they doing about it?

A. The State Department of Public Health is very much interested in arthritis. A few years ago they made certain recommendations concerning arthritis and other chronic diseases. As a result of these recommendations, the state legislature enacted a law which should be of great help to people who have arthritis and to physicians interested in arthritis. This act makes available twenty-five beds for patients with arthritis in one of the metropolitan hospitals. Such patients can stay there as long as six months if necessary, but most patients will not require nearly as long a stay as that. This will allow for more careful study and treatment of such patients. With this added information, the physicians of the state and the Department of Public Health will be in a much better position to decide how the many problems concerned with these socially and economically important diseases can best be met. Surely it is more important for the present that we learn methods of prevention than it is to build state hospitals for those so afflicted, for the latter might turn out to be little better than almshouses. If we can learn to prevent and cure these diseases, we shall be doing much more for the individual patients and lessening the load of the taxpayer.

In closing, let me say that as soon as you have any joint symptoms, the thing for you to do is not to worry along with them, as worry only makes them worse. Consult your doctor at once. This will give him a chance to take advantage of what is already well known concerning the successful treatment of chronic rheumatism or arthritis and make it possible for him to treat you intelligently and diligently.

Q. Do you think, Doctor, that these methods may some day lessen the number of rheumatic cripples?

A. Yes, I do. Such methods have brought tuberculosis under control in Massachusetts and similar methods may do the same for chronic rheumatism.

INDIGESTION AND HOW TO TREAT IT

Edward S. Emery, Jr., M.D.
Harvard Medical School

Green Lights to Health Broadcast, WAAB—April 9, 1941.

Indigestion is common to all ages, from the baby who wakes up crying in the middle of the night, to persons in old age who discover that the good old days when they could eat anything and everything without fear of any distressing results are gone.

The causes of indigestion are many. Some endanger life; some are serious because their chronicity handicaps one's daily activities; and some are simply temporary disorders which are inconvenient. Doctors classify the causes in two groups. The first includes persons whose stomach or intestines show the presence of a definite disease. If the patient is operated upon this abnormality can be seen or felt. These patients are said to have *organic* disease. The second group includes the sufferers from indigestion whose organs are fundamentally healthy, but are not working properly. These persons are classified as having a *functional* disturbance. All of us have friends or acquaintances who have suffered for years from periodic stomach trouble, without any visible impairment to their health. Unfortunately this may lead us to assume that indigestion is not a serious matter. Individuals who will consult a physician promptly for the slightest disorder of their heart or kidneys, will ignore discomforts from their stomach, on the false assumption that they have little significance. This is a mistake, because about *one-half of all stomach trouble* is caused by *organic disease*, which, if not recognized promptly, may be a cause for grave concern later on. In addition, there are many patients with *functional* troubles whose health becomes seriously impaired by improper dieting, the ill-advised use of laxatives and other self-imposed treatments.

Any person who suffers from the two following conditions should consult a physician at once:

First, if he recognizes blood or very black material coming from the stomach or intestines.

Second, a person who begins to suffer from indigestion after the age of forty, irrespective of the severity or kind of symptoms which he has—for this usually means the development of some serious disease. Except for these warnings, an individual cannot determine for himself, whether he is suffering from a serious or a simple disorder. Unfortunately one cannot assume that mild symptoms accompany a harmless condition. There is no more *insidious disease than cancer of the stomach*, which may produce the mildest symptoms; and physicians frequently see a patient only after the disease has reached an advanced stage—because the patient was lulled into a false security, by the apparent insignificance of his symptoms. Ulcer of the stomach is another disease which may produce only minor discomforts.

Another common error against which I should like to warn you is that a physician can make a diagnosis by merely listening to your story. In many instances the symptoms are so indefinite—so numerous—and so involved that the doctor cannot decide what is wrong, until he has had an opportunity to study the patient by all the means at his disposal. This takes time and may be expensive, and unfortunately there are patients who lose confidence in a physician if he does not make a diagnosis at the first visit. It is usually true that the more a physician knows, the less likely he is to make a snap diagnosis; therefore, the wise patient will consult his physician with the knowledge that he should have a thorough study. This study will usually include several laboratory investigations in addition to an X-ray examination.

The X-ray machine is a tremendous help to the physician, but it has certain limitations, of which the general public is not usually aware. In the hands of a skilled X-ray man it will reveal the presence of organic disease in a high percentage of cases—*but not in 100 per cent.* The conscientious physician is not willing to place his entire reliance upon an X-ray report. Remember also that the real value of the X-ray is in determining the presence or absence of organic disease. If the patient is suffering from a functional disorder, the X-ray gives little help in deciding the cause of the patient's symptoms. Improper habits of eating are a frequent precursor of functional indigestion. It is literally true, that the platter kills more than the sword, and individuals who will do everything possible to protect their skin, will think nothing of subjecting their stomach to a variety of abuses. When one observes the eating habits of the average American, it is not surprising that indigestion is *common,* but it is *amazing* that mankind does not suffer more. All kinds of substances are eaten under the name of food—because they tickle the palate—but with utter disregard for what their effect may be on the lining of the stomach. It is easy to determine the irritating qualities of such things as pepper, mustard, and alcohol, by simply rubbing them on a delicate portion of the skin. The housewife knows that if fat burns on the stove, her eyes will smart, due to the formation of a highly irritating acid; yet we may swallow the same acid; and then, if indigestion follows, believe that we have a weak stomach.

Rapid eating, and poor teeth which interfere with proper mastication, are other causes for indigestion because failure to chew the food thoroughly forces our stomach to perform what we are too lazy to do ourselves.

In many instances, the stomach does not perform its functions properly because the patient is under a nervous strain. This, of course, cannot always be avoided. Insufficient sleep, rapid automobile driving and the attempt to burn the candle at both ends cause nervous tension—much of which can be eliminated, if an individual is willing to use the necessary will power.

There is an old saying, that one man's food is another man's poison, and our modern knowledge explains why this is so. It is now known that certain persons are sensitive to, or as the doctors say, allergic, to certain foods. This allergy may manifest itself by all the various symptoms described as indigestion and which can be relieved only when the offenders are discovered by special tests, and eliminated from the diet.

The frequent use of cathartics will cause indigestion by their irritating effect on the intestines.

So we find that there are many causes for indigestion and hence there must be many treatments. What is good for your neighbor may not benefit you—and may even be harmful. The type of treatment to be used is based on what causes the patient's trouble and not on the kind of symptoms which he has.

In conclusion, I have tried to make clear that indigestion should not be regarded lightly—that each case warrants individual attention, a thorough investigation and conscientious treatment.

Questions

Q. Dr. Emery, I understood you to say that one should never use pepper, mustard and alcohol because they are irritating. Is that correct?

A. No. I did not mean to imply that these foods should never be eaten. It is, of course, all right to take them in moderation. I simply wished to caution persons against the excessive use of these substances which have an irritating effect upon the stomach.

Q. I also understood you to say that some persons develop indigestion from the use of cathartics. How is it possible for persons to do without cathartics if they have sluggish intestines?

A. Provided there is no obstruction, sluggish intestines usually result from faulty habits of living and improper diet. Nearly all individuals can regulate their intestines if a well-balanced diet is taken, with a correct choice of vegetables and fruits. Many persons make the mistake of eating too many fruits and not enough vegetables. In addition, the individual must cultivate regular habits.

Q. Is it wrong to take bicarbonate of soda for stomach complaints if this medicine gives relief?

A. The taking of a moderate quantity of bicarbonate of soda does not do the stomach or body any harm. The objection to its use, particularly if taken by patients on their own responsibility, is that it simply relieves one's pain temporarily, but does not cure the underlying cause of the symptoms. The same objection holds for taking patent medicines. There are many drugs on the market which are advertised for the relief of indigestion, but even though they do relieve the patient's symptoms, there is always the danger that some serious disease will go unrecognized for so long a time that a cure cannot be effected.

Q. What is the best way to treat the stomach trouble that causes sick headaches?

A. In the first place, the popular idea that sick headaches are the result of indigestion is incorrect. It is true that a sluggish intestinal tract may occasionally cause a headache. It is also true that this is more noticeable in patients who tend to suffer from headaches; however, nine times out of ten, the stomach symptoms which accompany the so-called sick headache are the factors which produce the headache and not the causes. The treatment for these patients consists of overcoming those things which precipitate a headache, of which eyestrain, general fatigue and nervous tension are the commonest causes. There is an occasional patient whose headache is brought on by eating some food to which he is allergic.

Q. Will disease occurring in some part of the body besides the stomach and intestines cause indigestion?

A. Yes, it will, and there are many examples of just this sort of thing. Many patients who complain of what they call acute indigestion are really suffering from heart disease. It is also true that indigestion is sometimes one of the earliest symptoms in patients suffering from tuberculosis of the lungs. Disease of the blood may cause abdominal pain. Any chronic disease such as kidney trouble may cause a loss of appetite, gas and other symptoms of indigestion.

Q. Do you consider surgery or medicine better for the treatment of a person with an ulcer of the stomach?

A. One cannot say that either treatment is better. Both are indicated for certain conditions. The choice of surgery or medicine can be decided by the physician only when he has all the facts at his disposal.

Book Note

Public Health and Hygiene by Charles F. Bolduan, M.D., and Nils W. Bolduan, M.D. 366 pp. Philadelphia. Saunders. 1941.

This is the third revision of a publication which appeared first in 1929. As stated on the title page, it is a students' manual and is not written for the popular lay public. It has teaching instruction which may effectively meet today's requirements in the important study of the entire field of health and hygiene.

After a historical resumé, the authors explain the action on the body of microorganisms. The important communicable diseases are taken up individually and there are full considerations of other preventable diseases and conditions. The shifting emphasis on important problems in public health is also given due consideration; for example, we find consideration given to the problem of nutrition, the chronic diseases of middle life, mental diseases, and the problems of child hygiene.

There are chapters, though rather inadequate, on the important problems of school medical inspection, public health nursing, and health education. Health administration is also discussed in the last section of the book.

While rather technical and in other aspects lacking in the full treatment of the subject, the text is nevertheless an authoritative source of much valuable information brought up-to-date.

REPORT OF DIVISION OF FOOD AND DRUGS

(As required by General Laws, Chapter 111, Section 25.)

During the months of January, February, and March, 1941, samples were collected in 204 cities and towns.

There were 1,777 samples of milk examined, of which 169 were below standard, from 10 samples the cream had been in part removed, and 23 samples contained added water. There were 2,272 bacteriological examinations made of milk, 1,930 of which complied with the requirements. There were 8 bacteriological examinations made of milk beverages, 4 bacteriological examinations of hamburg steak, and 1 bacteriological examination of sausage, all of which complied with the requirements. There were 84 bacteriological examinations made of cream, 11 of which did not comply with the requirements; and 36 bacteriological examinations of mattress fillings, 6 of which did not comply with the requirements.

There were 387 samples of food examined, 128 of which were adulterated. These consisted of 8 samples of butter, all of which were below the legal standard in milk fat; 4 samples of cream which were low in fat for the grade specified; 4 samples of clams which contained added water; 4 samples of hamburg steak, 2 of which were decomposed, and 2 contained a compound of sulphur dioxide not so labeled; 35 samples of sausage, 22 of which were decomposed, 2 contained starch in excess of 2 per cent, and 11 samples contained a compound of sulphur dioxide not so labeled; 2 samples of lamb patties, and 1 sample of shrimp, all of which were decomposed; 58 samples of olive oil, 2 of which contained corn oil, and 56 samples contained cottonseed oil and 2 also contained color; 7 samples of vinegar, 4 of which contained less than 4.00% acetic acid, and 3 samples had been diluted and were not so labeled; and 5 samples of bedding and upholstering materials, 2 of which were samples of feathers and down which did not contain the materials as specified, and 3 samples of fibers which did not contain the materials as specified.

There were 42 samples of drugs examined, of which 5 were adulterated. These consisted of 4 samples of citrate of magnesia, and 1 sample of hydrogen peroxide, all of which did not conform to the requirements of the U. S. Pharmacopoeia.

The police departments submitted 75 samples of liquor for examination. The police departments also submitted 5 samples to be analyzed for poison or drugs, consisting of 1 sample of white pills which was found to contain morphine, 1 sample of white powder which was found to be opium, 1 sample contained heroin, one sample was a capsule containing quinine, and 1 sample of herbs was found to contain cannabis sativa.

There were inspected 334 plants operated for the pasteurization of milk; 185 restaurants; 49 soft drink plants; 84 bakeries; 10 ice cream establishments; 29 dairies; 1 candy factory; and 375 mattress establishments.

There were 63 hearings held pertaining to violations of the laws.

There were 68 convictions pertaining to violations of the laws, $2,685 in fines being imposed.

Ernest Harnisch of Methuen; Gus Pocius of Middleboro; Anastos Velantzas of Lowell; Frank Lanzillo of Wakefield; John Velozo of Somerset; and Rosaire Bellerose of Charlton, were all convicted for violations of the pasteurization law and regulations. Ernest Harnisch of Methuen appealed his case.

Kapreal Hagopian of Marlboro; H. P. Hood & Sons, Incorporated, of Newburyport; Joseph W. Clark of West Brookfield; and Felix Noel of Granby, were all convicted for violations of the milk laws. H. P. Hood & Sons, Incorporated, of Newburyport, appealed their case.

H. P. Hood & Sons, Incorporated, of Springfield, was convicted for violation of the milk grading regulations.

Leonard Linchitz, 3 cases, Jack Kaplan, and Myer Elgart of Woburn; Jennie Alpert, 2 cases, and Joseph Freedman of Roxbury; First National Stores, Incorporated, and Charles Fiermont of Newton; Emilio Torelli of Framingham; Hugh Morrison of Everett; L. A. Manzi, Incorporated, 3 cases, of Worcester; Economy Grocery Stores Corporation of Hudson; Simon Grenon and Brockelman Brothers, Incorporated, 2 cases, of Marlboro; Armour and Company, and Paul Esaian of Boston; Antonio Grupposo of Natick; Konstanty Jankowski and William Ritzo of Norwood; New England Market, Incorporated, of Cambridge; Michael O'Loughlin of South Boston; Solin's Market, Incorporated, of Chicopee; Herbert Tillman, The Massachusetts Mohican Company, Incorporated, and Economy Grocery Stores Corporation of Springfield; Newton Howes, Hyman Bernstein, 2 cases, and Adrian St. Amand of Holyoke; Harold Jaffe, Grand Union Company, Incorporated, and Samuel Levy of Pittsfield; and Antonia Klys of Palmer, were all convicted for violations of the food laws.

First National Stores, Incorporated, of Newton; and Economy Grocery Stores Corporation of Springfield, appealed their cases.

L. A. Manzi, Incorporated, 3 cases, of Worcester, was convicted for misbranding.

Purity Bakeries, Incorporated, of Springfield, were convicted for violation of the bakery law.

Johnson Wholesale Perfume Company, Incorporated, of Springfield, was convicted for violation of the drug law. This company appealed its case.

Boston Dry Goods Manufacturing Company, Pinkus Chuker, 2 cases, New England Dry Goods Company, and R. H. White Company, of Boston; Etta Hutner of Springfield; Sears, Roebuck & Company, Fred Wilson, and New England Furniture Corporation of Pittsfield; Ellis H. Russell Furniture Company, Incorporated, of Salem; The L. Buchman Company, Incorporated, 2 cases, of Brooklyn, New York; Edward I. Levine of New Haven, Connecticut;

and The American Upholstering Corporation of Waterbury, Connecticut, were convicted for violations of the mattress laws.

In accordance with Section 25, Chapter 111 of the General Laws, the following is the list of articles of adulterated food collected in original packages from manufacturers, wholesalers, or producers:

Cream which was below the legal standard for the grade specified was obtained as follows:

One sample each, from Theodore Devine of Taunton; Whitcomb Farms, Incorporated, of Littleton; William C. Dunn of Ipswich; and Harry Wyman of Malden.

Butter which was low in fat was obtained as follows:

Two samples from Francis Promisel of Chelsea; and one sample each, from Morris Fishman and Benjamin Spack of Dorchester; Mayflower Creamery, Incorporated, of South Boston; Cudahy Company of Holyoke; Chicopee Provision Company of Chicopee; and Holland Butter Company of Springfield.

Olive oil which contained cottonseed oil was obtained as follows:

Thirty samples were obtained from Cantania Importing Company of Boston; 8 samples from Dominic Previte of Boston; 3 samples from I. Golini & G. Monachetti of Providence, R. I.; and 1 sample each, from Joseph Rapallo of Medford, and F. Antenuccio of Providence, R. I.

Two samples of olive oil which contained cottonseed oil and color were obtained from Cantania Importing Company of Boston.

Four samples of olive oil which were misbranded and adulterated were obtained from L. Manzi, Incorporated of Worcester.

Lamb patties which were decomposed were obtained as follows:

One sample each, from Grand Union Company, Incorporated, of Pittsfield; and F. G. & N. Howes of Holyoke.

Hamburg steak which was decomposed was obtained as follows:

One sample each, from Hyman Bernstein of Holyoke; and United Market (Sam Adleman) of Roxbury.

Hamburg steak which contained a compound of sulphur dioxide not so labeled was obtained as follows:

Two samples from Charles Mincer of Boston.

Sausage which was decomposed was obtained as follows:

One sample each, from Ermando Morini, William Ritso, Konstanty Jankowski, and James Elias of Norwood; Michael O'Loughlin of South Boston; Armour & Company of Boston; Paul Esaian of Cambridge; United Market (Sam Adleman), Joseph Freedman, Harry Rabinovitz, and Harry Prensky of Roxbury; Publix Food Market of Malden; The Great Atlantic & Pacific Tea Company of Newtonville, and Mohican Market of Newtonville; Clover Farm Stores of West Brookfield; Antonia Klys of Palmer; Harold Jaffe and Samuel Levy of Pittsfield; and F. G. & N. Howes and Adrian St. Amand of Holyoke.

Sausage which contained a compound of sulphur dioxide not so labeled was obtained as follows:

Two samples each, from Balsano Market, Gloria Chain Stores, Josephine Balmaco, and Fillamine Viscosi of Worcester; and one sample from Consumers Provision Stores, Incorporated, of Worcester.

One sample of sausage which contained starch in excess of 2 per cent was obtained from Hugh Morrison of Everett.

Vinegar which was low in acid was obtained as follows:

Two samples from Standard Pickle Company of New Britain, Connecticut; and 1 sample from Henry G. Sears Company of Holyoke.

There were 32 confiscations, as follows:—5 pounds of chicken, 10 pounds of duck, 792 pounds of turkeys, 2 pounds of beef kidneys, 1 pound of steak, 30 pounds of sirloin butts, 7 pounds of lamb chops, 49 pounds of pork, 20 pounds of bacon, 16 pounds of ham, 90 pounds of smoked shoulder, 2 pounds of tongue, 457½ pounds of veal, 33 pounds of hamburg steak, 22 pounds of lamb patties, 2 pounds of veal patties, 8 pounds of turkey croquettes, 47 pounds of sausage meat, 26½ pounds of pork sausage, 2 pounds of fish, and 120 pounds of clams. These confiscations were made because the food was decomposed and unfit for human consumption.

The licensed cold storage warehouses reported the following amounts of food placed in storage during December, 1940: 205,110 dozens of case eggs; 827,075 pounds of broken out eggs; 194,101 pounds of butter; 7,157,695 pounds of poultry; 5,999,851 pounds of fresh meat and fresh meat products; and 5,348,754 pounds of fresh food fish.

There was on hand January 1, 1941: 224,580 dozens of case eggs; 1,454,174 pounds of broken out eggs; 1,124,806 pounds of butter; 11,704,145 pounds of poultry; 9,683,565 pounds of fresh meat and fresh meat products; and 25,428,231 pounds of fresh food fish.

The licensed cold storage warehouses reported the following amounts of food placed in storage during January, 1941: 81,030 dozens of case eggs; 610,720 pounds of broken out eggs; 180,600 pounds of butter; 2,656,541 pounds of poultry; 6,559,946 pounds of fresh meat and fresh meat products; and 5,101,983 pounds of fresh food fish.

There was on hand February 1, 1941: 92,340 dozens of case eggs; 1,103,664 pounds of broken out eggs; 605,341 pounds of butter; 11,519,475 pounds of poultry; 12,993,106 pounds of fresh meat and fresh meat products; and 19,629,543 pounds of fresh food fish.

The licensed cold storage warehouses reported the following amounts of food placed in storage during February, 1941: 70,020 dozens of case eggs; 740,832 pounds of broken out eggs; 180,389 pounds of butter; 1,472,856 pounds of poultry; 2,948,754 pounds of fresh meat and fresh meat products; and 4,855,657 pounds of fresh food fish.

There was on hand March 1, 1941: 65,130 dozens of case eggs; 979,874 pounds of broken out eggs; 427,062 pounds of butter; 9,925,629 pounds of poultry; 12,918,777 pounds of fresh meat and fresh meat products; and 12,605,768 pounds of fresh food fish.

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PUBLICATION OF THIS DOCUMENT APPROVED BY THE COMMISSION ON ADMINISTRATION AND FINANCE
7m-10-41-7524

APR 10 1942
STATE HOUSE, BOSTON
vol. 29

THE COMMONHEALTH

Volume 29
No. 1
Jan.-Feb.-Mar.
1942

TUBERCULOSIS

MASSACHUSETTS
DEPARTMENT OF PUBLIC HEALTH

1942-43

THE COMMONHEALTH

Quarterly Bulletin of the Massachusetts Department of
Public Health

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FOREWORD

Paul J. Jakmauh, M.D., *Commissioner*
Massachusetts Department of Public Health

In the six years that have passed since tuberculosis formed the subject of an issue of the Commonhealth our methods of control of this disease have undergone no fundamental changes. The developments which have occurred and which are set forth in these articles are an outcome principally of two factors: the further refinements of techniques already in use; and the increasing determination of health workers to extend our attack on all fronts in a vigorous, untiring attempt to eliminate tuberculosis as a major cause of suffering and death.

Funds and enthusiasm are essential for our task, but they are of little value, and may even be harmful, without competent technical knowledge to guide their use. There are few fields in which the cooperation of related groups is so necessary as in this one. Physician, public health nurse, educator, medical social worker, rehabilitation worker, nutritionist—all have their role. In these pages representatives of the Department of Public Health and other groups engaged in tuberculosis work in Massachusetts discuss their contributions to tuberculosis control.

A PLEA FOR COMPLIANCE WITH REGULATIONS FOR THE CONTROL OF TUBERCULOSIS

Frederick T. Lord, M.D.
Boston, Massachusetts

EDITOR'S NOTE:

In September, 1941, Dr. Frederick T. Lord, for many years an outstanding figure in the tuberculosis campaign in Massachusetts and president of the Massachusetts Tuberculosis League, was asked to write an article for this issue of *The Commonhealth.* It was with the realization that the Department had lost a loyal friend and trusted adviser that we learned of his death on November 4, 1941. In addition to his activities in the tuberculosis field, Dr. Lord was an authority on other chest diseases. He was a leading member of the Department's pneumonia advisory committee which guided the five-year pneumonia study, and on many occasions freely gave us the benefit of his wisdom and experience.

Dr. Lord's article for *The Commonhealth* was nearly completed before his death and is published below without any revision, as received posthumously from his office. That it represents his views is certain from a conversation in October in which he expressed despair of ever improving case-finding until more aggressive measures were taken. The stumbling block, as he points out in his article, is that the State Health Department has not the degree of jurisdiction over local boards of health which would be necessary to enforce close supervision of reported cases and examination of contacts.

This article should serve as a challenge to boards of health everywhere.

In spite of the continued decline in the death rate from tuberculosis in Massachusetts, there are more deaths from the disease in the age group twenty-one to thirty-five than from any other single cause and further effort should be made to diminish the amount of community infection through improvement in case-finding and the hospitalization of open cases.

So far as hospital facilities are concerned, there are many empty beds in the sanatoria in the state and further bed provision is unnecessary.

With respect to case-finding, the proportion of cases of tuberculosis among contacts is larger than in any other group and an X-ray examination of all family and other contacts of known cases of tuberculosis is desirable. Patients with tuberculosis under the care of practicing physicians, in hospital and board of health clinics, and those reported as dying of the disease are the important starting points for the investigation of family and other contacts. If the family cannot afford an X-ray examination by a private physician, facilities are fortunately available through the state, county, and municipal sanatoria. The finding of tuberculosis by this means may offer the opportunity of benefit to the individual through the application of appropriate treatment at an early stage of the disease and of benefit to the family and the community by the breaking of contact. Provision must, if necessary, be made to meet adequately the needs of the family while the patient is under treatment in a sanatorium.

A regulation of the State Department of Public Health with an important bearing on control of tuberculosis is that it is mandatory for a physician to make immediate written notice over his signature to the local board of health of a case of tuberculosis, under penalty of forfeiture of fifty to two hundred dollars for refusal or neglect to give such notice (Sec. 111, Chap. 111). Another requirement is that "as soon as the diagnosis of tuberculosis has been established, arrangements should be made for an examination, including an X-ray of the chest, of all members of the immediate family and of other persons with whom the patient has been in close contact. . . ." (Rules and Regulations of the Department of Public

Health. Reprinted from *The Commonhealth,* Vol. 26, No. 1, Jan.-Feb.-Mar. 1939).

Public health practices differ in the various states of the Union and are peculiar in Massachusetts in that the State Department of Public Health is authorized to act only in an investigative and advisory capacity. It is charged with the responsibility of formulating regulations concerning diseases dangerous to public health including tuberculosis, but has no authority to make them effective.

Reliance must at present be placed on local boards of health to see that the regulation concerning immediate notification of cases of tuberculosis is carried out and that all contacts are examined by X-ray.

Local boards of health, in the state as a whole, fail to take action to see that these important measures are made known to every physician in the community and that they are observed or, if necessary, enforced.

In consequence of failure to enforce the regulation requiring immediate notification, a considerable proportion of fatal cases of tuberculosis are reported after death and the opportunity is then lost to see that the requirement regarding examination of contacts is satisfactorily fulfilled.

This situation may be remedied by the adoption throughout the state of the following suggestions:

A circular letter may well be sent annually to all practicing physicians calling attention to the notification regulation and the requirements regarding the examination of contacts. Physicians who neglect to report cases of tuberculosis should be visited by a representative of the board of health or summoned before the board for an explanation, warning and, if necessary, imposition of the penalty.

It should be the responsibility of the local board of health to see that all contacts, including contacts of cases under the care of private physicians as well as those attending clinics run by the board of health, are examined by X-ray of the chest and also that contact is broken if the tuberculosis is in a communicable form.

On receipt of a report of a case of tuberculosis from a physician, a letter may well be sent to the physician. It should be made plain that with respect to cases of tuberculosis under his care, contact should be broken if the disease is in a communicable form and arrangements should be made for an X-ray examination of the chest of all persons who are members of the immediate family and of others with whom the patient has been in close contact. Furthermore, if such arrangements are not made by the physician within a reasonable time after the report of the case, or are not satisfactory to the board of health, such measures as are necessary should be taken.

It should be made the duty of a physician who has a case of tuberculosis under his care to report once a year to the board of health on a card furnished by the board for this purpose stating whether the patient still lives at the original address, of any change of address, or a change of the patient to the professional care of another physician.

RECENT CHANGES IN THE DIAGNOSIS AND TREATMENT OF PULMONARY TUBERCULOSIS

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The past ten years have done much to improve diagnostic methods and standardize the treatment of pulmonary tuberculosis. But, fortunately, there are always trials of new procedures in both diagnosis and treatment and what is standard today may be discarded tomorrow. The present status of the problem, with the more recent changes, may be briefly given as follows:

Diagnosis

The most important recent improvements in diagnostic methods are changes in X-ray technique, a simplified tuberculin test, more careful search for tubercle bacilli, greater use of the bronchoscope and improved differential diagnosis.

X-ray: Constant research on tubes and films has led to greater perfection of the chest roentgenogram and unless there is some drastic change in principle we cannot expect much more improvement in the standard chest film.

Small (4 x 5 inch) films: The standard 14 x 17 inch chest film has at least two disadvantages. It is expensive and takes up a great deal of room. A recently developed apparatus takes a 4 x 5 inch photograph of the shadow on the fluoroscopic screen and does much to eliminate these difficulties. The principle criticism has been that the small film fails to bring out the shadows of minimal lesions lying behind ribs. But it is now claimed that stereoscopic 4 x 5 films do away with even this error. However, the small X-rays are being used at present largely for mass surveys and are not likely to replace the standard films in the study of known or suspected disease. They are employed in a few centers in the examination of recruits or draftees for the U. S. Army.

Fluoroscopy: With a modern tube and fluoroscopic screen, an expert observer who has taken the time necessary to accommodate his eyes to the dark will miss very few of even the minimal lesions of pulmonary tuberculosis. But, except under these conditions, the method is not safe for even a mass survey and should never be relied on as the sole roentgenographic study in a doubtful case. Of course, the fluoroscopic examination is an important part of any complete roentgenographic study of the chest.

A newcomer in the X-ray field is the *"laminograph"* ("planigraph" or "tomograph"). This apparatus records the shadow of a specific plane or layer of the lung while eliminating the shadow of tissue in the other planes. It was hoped that it would be of particular help in determining the presence or absence of a tuberculous cavity. The present conclusion is that the method is of value, but that the ring shadows which it brings out are by no means always those of cavities.

Tuberculin Patch Test: A much simplified office tuberculin test is the patch test. Instead of using a scarifier or syringe, one simply cleans the skin with acetone or ether and applies an adhesive strip which has on it small squares of filter paper, previously soaked in old tuberculin and dried. Except in cases where a marked reaction is expected, the adhesive is left in place for 48 hours, removed, and the reaction read 48 hours later. Extensive use of this test has proved that it almost never misses a case of active tuberculosis, except where other methods have also failed.

Examination of Gastric Contents: Probably the most valuable of the recent diagnostic methods is the examination of the fasting gastric contents for tubercle bacilli. In cases where satisfactory specimens of sputum can be obtained, this test is seldom necessary. But, where the X-ray shows a lesion of questionable activity and no sputum can be obtained, the study of the gastric contents gives the answer in a surprising number of cases. This is true even in the "benign" type of childhood infection. It must be remembered that there are acid-fast bacilli other than tubercle bacilli and a guinea pig inoculation is usually necessary before the diagnosis of tuberculosis can be considered as certainly established. But, if the original direct examination is carefully performed and interpreted, experience has shown that the first report is almost always confirmed by the guinea pig test.

Guinea Pig Inoculation of Sputum: If active tuberculosis is suspected and repeated sputum examinations by direct smear and concentration methods have been negative, a guinea pig inoculation of the sputum is indicated. But even one negative guinea pig does not rule out tuberculosis.

With proper media and an experienced laboratory worker, *sputum cultures* are almost, if not quite, as reliable as the guinea pig. Many institutions are now using this method of detection of tubercle bacilli in preference to animal inoculation.

Bronchoscopy: In cases of persistent localized wheezing or collapse of one or more lobes of the lung, tuberculosis of the bronchus must be considered as a possible cause, unless some other diagnosis is evident. In bronchial tuberculosis the sputum is usually positive, but in many doubtful cases a bronchoscopic examination is necessary to establish a diagnosis. In competent hands this procedure is practically devoid of danger and is becoming an important part of sanatorium routine. Not only may it prove the diagnosis of tuberculosis where cancer or other disease has been suspected, but it may also prove cancer or benign tumor in cases that are being wrongly treated for tuberculosis.

Differential Diagnosis: We are continually adding to our knowledge of differential diagnosis of lung diseases. We have already mentioned collapse (atelectasis) of a lobe or an entire lung, and the part played by bronchial tuberculosis in these cases. In the past, sharply defined circular shadows in the X-ray have usually been interpreted as due to tumors, and true miliary shadows as tuberculosis. But careful follow-up has shown that conglomerate tubercle can cast a shadow indistinguishable from tumor, that typical miliary lesions occur in malignancy and sarcoid disease, and that confusing shadows, not as typically miliary, occur in silicosis and a number of other conditions. One must be careful in making a diagnosis from the X-ray alone.

Treatment

There have been few improvements in the treatment of pulmonary tuberculosis since the general acceptance of *compression therapy* some years ago. Of the various methods of compression (collapse) artificial pneumothorax is the most commonly employed. It is being used on 30-40% of the patients in most of the better sanatoria today. Under certain conditions its value is unquestionable. But as the years go on more care is being exercised in choosing the cases in which it is to be used. It should not be used in hopeless bilateral cases. The strictly surgical measures are discussed elsewhere in this issue of *The Commonhealth.*

Sanatorium care still holds the place of first importance. Most cases do better for at least one session of sanatorium care and education. This is, of course, particularly true in cases needing compression therapy. In the writer's opinion much more care should be exercised in sanatoria in keeping the asymptomatic cases and the pleurisies with effusion from contact with cases with positive sputum.

Chemotherapy: Laboratory experiments with sulfanilamide, sulfapyridine, and sulfathiazole have given little hope that these drugs will be effective in the treatment of human pulmonary tuberculosis. Recently, however, the Mayo Clinic has reported exceptionally good experimental results with "promin" and trials now going on may show that it has clinical value.

Vitamins: Vitamin D (in cod liver oil) has long been accepted as of value in tuberculosis and its use is being continued, particularly, in intestinal tuberculosis.

Vitamin C has been found to be low in almost all cases of tuberculosis with fever, and these patients improve somewhat when the vitamin is given in concentrated form.

Many studies have been made to try to associate hemoptysis in tuberculosis with lowered Vitamin K. So far the proof is lacking except in the rare case when it may be definitely needed.

SOURCE-FINDING EXPERIENCES AT THE INFANTS' AND CHILDEN'S HOSPITAL, BOSTON, MASSACHUSETTS

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A boy of twenty months was admitted to the Hospital very recently with obvious deformities due to tuberculosis of the dorsal spine. When he was about five months old his mother had developed cough and fever. Not until five months later was she admitted to her County Sanatorium. Her husband and two other children, aged twelve and nine years, were examined at that time and found free of important tuberculosis but this child had not been examined because he was "too young."

A young minister brought his two-year-old son to the Infants' Hospital because of symptoms which proved those of tuberculosis meningitis. There was no tuberculosis in the family but the father of the maid employed in the home had died of that disease and the maid herself was then found to have tuberculosis.

A little girl with obvious evidences of tuberculosis meningitis was brought to the Children's Hospital from a small city to the south of Boston. The investigation of the household was placed in the hands of the local visiting nurse, who wrote of the results of her work as follows: "The child's parents conduct a boarding and rooming house where about twelve young men live. I have had the father and mother and eight men thus far examined and X-rayed at the Norfolk County Hospital Diagnostic Clinic. There are still four more who are rather difficult to get interested, but they promised me that they will do as I ask when their work is not too strenuous. The father and mother showed no signs of tuberculosis. They have no other children. Seven of the men are all right but the eighth man was found to be an advanced case of pulmonary tuberculosis with cavities in both lungs and a positive sputum. He is now hospitalized at the Norfolk County Sanatorium. The mother told me that the little girl was very fond of this man and played with him constantly. I think there is no doubt where she picked up the infection."

L.K. entered the Children's Hospital in 1934 at the age of fourteen months with a large infiltration of the right upper lobe. He was the only child in the family. His mother had been a patient of one of the Boston clinics but had never been found actively tuberculous. The father had a history of pleurisy, was alcoholic, and, fortunately, not often at home. Since the mother refused to let the child go to a sanatorium he stayed at home under Out-Patient Department care, and did well. In 1936 the mother herself showed evidence of tuberculosis and went to a Sanatorium in October of that year. In March of 1937, a second child was born in the sanatorium and stayed there for the first month or two of his life, at the end of which time he and his mother were discharged home. At five months she brought this child to the hospital and he was found to have a pulmonary tuberculous infiltration. He was sent to the North Reading State Sanatorium where he spent somewhat more than a year, and has been discharged as recovered. In January, 1939, the father, whose examination had never been brought about, entered the Boston City Hospital with pulmonary, intestinal, and laryngeal tuberculosis. He died shortly thereafter. It seems very likely that here an uncooperative tuberculous father infected the mother and either directly or indirectly the only two children of his family. While it was impossible to work with him, the health of the children was kept under some degree of supervision in a way which may have turned the balance in their favor.

In November, 1941, a little girl just over two years of age was sent to the Hospital by her physician because of five days of vomiting, irritability and lassitude. A spinal puncture and tuberculin test indicated the diagnosis of tuberculous meningitis. The father, mother, and the six other children were all thought at the time the admitting history was taken, to be quite free of any tuberculous disease. An examination of the family was secured through the cooperation of the local health department and the parents were found to be roentgenologically negative while none of the children had very significant roentgenological findings. Nevertheless, all but one of the other children were tuberculin positive and the grandfather, with whom the family had been living, was found to have chronic pulmonary tuberculosis at both apices.

Here are brief stories concerning six children, drawn almost at random from our records. The frequency of tuberculosis found among the contacts of a tuberculous child depends very largely on the amount of effort devoted to this type of case finding. In our own clinic, which has only had the help of a half-time social worker in investigating from 100 to 200 children annually, the source of infection has been found in about half of our tuberculous patients. Since tuberculosis comes from tuberculosis, if one could follow every move a child makes and could examine every person with whom he has come in contact, one should discover the source of contagion in 100 per cent of infected children. This is based, of course, on the supposition that the children are not eating foods which contain tubercle bacilli and, fortunately, in this vicinity that statement is almost literally true. Unless one *can* follow every contact of every child, one must for the sake of efficiency decide which children should be given the available attention. We have been guided in this individualization by a few simple principles, which may be of interest to others facing these situations. The first principle is based on our past experience of the ages at which tuberculous infection is most dangerous, as shown by the table of our hospital mortality given here.

Age Distribution of 366 Deaths from Tuberculosis (All Forms) at the Children's & Infants' Hospitals

1923-1940

Infancy		Young Childhood		Older Childhood	
Age	Deaths	Age	Deaths	Age	Deaths
0-1 years	93	2 years	60	7 years	11
1-2 years	117	3 "	30	8 "	5
		4 "	18	9 "	3
		5 "	16	10 "	3
		6 "	6	11 "	4
0-2 years	210	2-7 years	130	7-12 years	26

Among children under twelve, it is very apparent that susceptibility is great in the first few years, and decreases very much thereafter. It will be noted how regularly the age of two appears in the short abstracts given above. Because of this our interest is focussed particularly on homes where there are small children or infants. Moreover, in every home where there is any suspicion of tuberculosis, the infants in that household should be examined with as much if not more care and interest than the older children. Another point is that if the original patient is a tuberculous infant, the source of infection is usually found at home, since the contacts of a small baby are so limited. Thus it is better to spend considerable effort on the recalcitrant parents of a tuberculous infant than in pursuit of the numerous contacts of an older child.

A second principle arises from the fact that *important* household contacts usually involve several children in the family. Thus if only one of the older children in a household reacts to tuberculin, time is not very profitably spent in examining the parents of those children. On the other hand, if the majority of children in a family react, the chance is large that an active infection will be found in a parent or some other member of the household. A third principle, obvious from the histories given above but nevertheless frequently neglected, is that the infectious individual need not be a blood relative of the family since visitors, neighbors, boarders, and particularly household help may be the source of trouble. Another fact which cannot be stressed too often is that only by X-ray examination of the contact or by a negative response to the tuberculin test (or both) can one be quite sure that tuberculosis is not present. Normal energy and weight, absence of fever or cough—all of these things mean really very little.

Another principle, and one of the most difficult to apply, is that household situations are never static but that they keep changing, so that a family in which perhaps one child and one adult are infected today may be a family in which both parents and all the other children will be infected a year from today; or, on the other hand, a family which was completely free of tuberculosis two years ago cannot be expected to remain so today.

A lesson learned by sad experience is that one gets nowhere by threatening the contacts of a tuberculous individual. It has been a repeated observation that the relatives of a child, surprised to learn that tuberculosis is present and in a considerable state of nervousness over a rather poorly-understood situation, may flatly refuse to be themselves examined. If this is met by a truculent attitude on the part of the physician, they simply disappear from view. If it is met with kindness and patience, a goodly share of them will finally follow one's wishes in the matter.

From a slightly different angle, a question which frequently arises is—*"How dangerous to his associates is the tuberculous infant or child?"* A general answer cannot be given except to say that unless the child has an open lesion (one directly opening into the tracheobronchial tree), and unless such a child has a considerable cough, he is probably not a source of danger. Children cough less often than do adults and seldom expectorate; moreover, except in young infants, open lesions have been rare in our experience. We have watched for a long time for a situation in which the contacts of a tuberculous infant might be followed to note their development of tuberculin sensitivity, but so regularly is the infant only one of a number of tuberculin-positive children in the infected household, that no such opportunity has presented itself.

Finally, it should be pointed out that too much of what we have done has been a locking of the stable after the horse has been stolen. One grave reason for this is that often the first signs of tuberculosis which are noted by a parent in a small child mark the onset of tuberculous meningitis. In other words, by the time the disease has progressed far enough to be noted at all, it has reached an incurable stage. This means that one can stress a few very simple conclusions about contact infection with tuberculosis among children. The first is that the care of no tuberculous individual is complete without the examination of all the members of his family to certify that they are free of the disease. The second is that anyone coming into frequent contact with infants and small children should be certified by a tuberculin test or X-ray (or both), as free of infection. And the third is that any group of small children, such as those in nurseries, well-baby clinics, etc., may profitably be tested for important occult tuberculous infection. These three procedures would have prevented most of the situations described at the beginning of this article.

TAKING STOCK OF TUBERCULOSIS CASES

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One of the administrative problems of the local board of health in the control of tuberculosis is the accumulation in the office files of reported cases of unknown status. Often after the initial report no word is received from the reporting physician of the patient's condition, and unless a death certificate has been received the name remains indefinitely in the active file. In most instances such cases continue to be visited by the public health nurse, usually with increasing irritation on the part of the patient and increasing apathy on the part of the nurse. Patient and nurse remain equally ignorant of the need of further supervision, and tuberculosis nursing becomes increasingly unpopular.

As a part of its case-finding program the Department of Public Health in the summer of 1936 conducted clinics for the examination of contacts in cooperation with the boards of health of certain cities and towns. At that time it became apparent that the local files were clogged with large numbers of inactive cases and an attempt was made to determine the actual status of all reported cases in those communities. As a result of two or three summers' work it became apparent that only about one-half of the cases carried were in need of supervision, while the other half represented dead wood which consumed the nurse's time to the detriment of the nursing service.

So enthusiastic was the response of both patients and boards of health to this work that in 1938 a Federal Grant was obtained for the employment of an additional physician and nurse on the Department's field clinic staff and "Reclassification Clinics" were regularly added to the activities of the Division of Tuberculosis.

All such clinics have been conducted at the request of local boards of health. When a request has been received a nurse from the clinic staff visits the board and arranges for a checkup of all cases on file. The local roster of cases is checked against the state file and cases that have died, have moved out of town or cannot be located after careful search, are eliminated. The remaining list is then further reviewed with the local dispensary or the sanatorium serving the area to identify the cases known by these agencies to be active. When a case is under the supervision of a local physician who has requested that his patient be not visited by the local tuberculosis nurse, the reclassification is made either from a written report of the physician in question, or with his consent by the routine check-up at this clinic.

The purpose of the examination is explained to such patients by the visiting nurse, and they are urged to come to the Reclassification Clinic which is set up at the local dispensary or board of health office. There a brief but careful history is taken and an X-ray of the chest is made, supplemented by a physical examination by the clinic physician. A sputum specimen is obtained if the patient is raising. Reports of findings are made to the board of health and to the private physician if the patient has one or can be persuaded to go to one.

From September, 1939, to October, 1941, the reported cases of tuberculosis in 116 Massachusetts cities and towns have been reviewed in this manner. The detailed findings are given in the following tables:

116 MASSACHUSETTS CITIES AND TOWNS

Number of reported cases on State list		13,299
Removed from list after checkup with local list		3,770
1. Deaths	1,159	
2. Moved	1,449	
3. Not located	983	
4. On inactive list (local dispensary)	179	
Number of reported cases to be reclassified		9,529
Number not visited		4,186
At sanatoria and other hospitals	1,164	
Local X-rays available for review	3,022	
Number visited		5,343
Number examined at clinic	3,110—58.2%	
Number refused clinic	2,233—41.8%	

RECLASSIFICATION

	Total	Active List	Per Cent Active	Inactive List	School Clinic	Contact Observation
At sanatoria and other hospitals	1,164	1,164	100%	—	—	—
Local X-rays reviewed	3,022	1,801	60%	911	194	116
Refusals:						
X-rays reviewed	263	101	38%	148	2	12
Histories reviewed	1,970	1,157	59%	774	21	18
Number examined	3,110	720	23%	2,238	83	69
TOTALS	9,529	4,943	52%	4,071	300	215

It seems at first glance incredible that only 23 per cent of the patients who came in for re-examination showed evidence of active disease. The explanation probably lies in the fact that many were reported years ago and the diagnosis was never confirmed by X-ray. A considerable number now show fibrotic strands or pulmonary calcifications and state that they never had symptoms except for a few months at the time of diagnosis. A few did not realize that they had ever been reported to the board of health.

On the other hand, this checkup has brought to light a certain number of neglected cases with active tuberculosis. Some were found with positive sputum and in need of sanatorium treatment, and in other instances chronic cases were living under conditions which made them a continuous hazard to their families and friends. In many towns the program has given impetus to efforts for the regular examination of family contacts of all reported cases.

A discouraging aspect of the work has been the unwillingness of many patients to come in for re-examination. Had the remaining 40 per cent of patients visited been willing to report for X-ray the saving effected in subsequent follow-up would naturally have been even greater.

To get the majority of adult patients to attend such clinics it is necessary to hold them in the latter part of the afternoon and evening as many of these persons work during the day. This involves considerable inconvenience to the clinic staff, but has proved to be essential to the success of the project. In all but very small communities a portable X-ray to take 14″ x 17″ films is set up at the dispensary, board of health, or school building. When the number of patients is too few (less than 10) they are taken to the outpatient department of a sanatorium or to a consultation clinic.

The criteria for reclassification are obviously too complex to be put in a few simple rules and each case is considered individually. It may be said that on the active list are placed first and foremost those who are now under active treatment in a sanatorium, or receiving pneumothorax in the outpatient department. All thoracoplasty cases go on the active list; those whose X-rays indicate probable active disease; and those with a history of repeated reactivation in the past, regardless of their present X-ray findings. Cases reported within the past five years are held for further observation even if the lesion appears stable by X-ray and there are no symptoms.

On the inactive list are placed persons in the following groups: those who now show no disease by X-ray; those with stable lesions, if they have been asymptomatic for at least five years; and those with primary ("childhood type" or "hilum") lesions, if over 21 years old. Children reported as pulmonary cases whose X-rays are negative, and children with primary tuberculosis, who are exposed to a case within the family, are reclassified as "contact observation" or if of school age are added to the school clinic list.

With such a reclassification, additional cases on the active list can be dropped after another year or two of careful observation as it becomes evident that they are no longer in need of medical supervision. At the same time convalescent patients are encouraged to come back for re-examination so that they may be taken off the active list as soon as possible. The nursing staff is relieved of a great deal of unnecessary routine visiting and is given time to concentrate on the cases really in need of supervision. At the time of reclassification the board of health officials have been assisted when necessary in establishing adequate record systems to make available up-to-date information on all reported cases of tuberculosis, for unless the checking and re-examination of patients is made a regular part of the follow-up service, tuberculosis control measures tend to become a routine rather than an effectual part of the public health program.

ECONOMIC AND SOCIAL ASPECTS OF TUBERCULOUS INFECTION

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The contagiousness of tuberculosis was recognized centuries ago when the malady was only known as lung fever. This notion, however, was far from generalized and the ostracism that the consumptive shared, at times, with the leper was less a matter of hygiene than one of superstition. Concealed behind the enigma of its insidious onset and disguised under the vagaries of its capricious course, tuberculosis was also shrouded in mystery by the wasting characteristic of its terminal phase. It held the populations in awe and ranked, in their mind, with the choice punishments inflicted by vengeful gods on their enemies. A long time was to pass before a saner attitude prevailed.

In the middle of the last century some French Army surgeons noted that phthisis, as it was then called, was more prevalent among the troops in time of peace, when the men were confined to their barracks, than in time of war, when they lived in the open. They rightly concluded that overcrowding, lack of air and sunshine were factors in the development of the disease. Their observations have not only held true to this day but they have served as epidemiologic barometers and they remain valuable guides in our case-finding campaigns.

Was there also contagion? Jean Antoine Villemin answered in the affirmative in 1870 when he wrote, "Tuberculosis is a specific disease. . . . The phthisical soldier is to his messmates what the glandered horse is to his yoke-fellow." Twelve years later, Robert Koch's description of the tubercle bacillus closed, in a few sentences, a long chapter opened two thousand years before. All became clear. The germ of tuberculosis was transmitted through the material expectorated. The sputum and the droplets of saliva were the vehicles.

The question of transmissibility once settled, that of prophylaxis began. No one denied the possibility of infection, in theory, but many refused to consider it, in practice, as a serious menace. With the memories of the devastating rapidity of the ancient plagues still lingering in their mind, the peoples failed, for a long time, to notice the retarded and disseminated ravages of tuberculosis. The victims succumbed years after the time of their infection and often far away from the place where it had occurred. As long as the communities were scattered over wide areas, they remained blissfully unaware of the danger. It took the clanking of the machine age to shake them from their state of torpor.

The industrialization which transformed our social life during the last part of the nineteenth century reproduced, on an undreamed of scale, the effects of over-crowding already observed by the French Army surgeons, one hundred years earlier. Millions of country folks abandoned their wide acres, gathered in the confined interiors of the mills, and herded into unsanitary dwellings. Whole rural sections were drained toward the factories. Slums spread at the gates of the cities. An ever-increasing flock worked and lived without adequate space, without adequate light, without adequate air, easy prey to the tubercle bacillus.

On the farm, those migrators had not entirely escaped the germ of tuberculosis, but they had kept it in check with the help of sunshine and fresh air. They lost those allies when they moved to the city. Furthermore, the tuberculous person who infected two or three individuals in his country home, contaminated from eight to ten in his city tenement. A detailed study conducted by F. C. S. Bradbury in the towns of Jarrow and Blaydon (England) proves that the death rate from tuberculosis, lower in those towns than in the country at large before 1900, steadily increased after that time, following industrialization and over-crowding. Numerous surveys demonstrate that tuberculosis morbidity and mortality are invariably higher in over-populated areas. In the city of New York, a tuberculosis death rate of 19 per 100,000 population in the residential section of Bellevue-Yorkville where the rents average $200 a month soars to 256 per 100,000 in another area of the same section where the rents fall to $35 a month.

The effects of the unchecked close-range contagion of the eighteen eighties brought back memories of the old epidemics and the term, White Plague, assumed its full meaning. Clear thinking hygienists called for concerted action. For a while their voices fell upon deaf ears. And yet, seen in the light of today, how limpid was their language and how wise their advice as expressed by Herman M. Biggs! Here are the measures he suggested to prevent the spread of tuberculosis:

"1. The security of the public against tubercular meat and milk, attained by a system of rigid official inspection of cattle.

"2. The dissemination among the people of the knowledge that every tuberculous person may be an actual source of danger to his associates, if the discharges from the lungs are not immediately destroyed or rendered harmless; and

"3. The careful disinfection of rooms and hospital wards that are occupied or have been occupied by phthisical patients."

After years of unsuccessful effort and in spite of the opposition of medical societies, Biggs succeeded in making tuberculosis reportable in 1897. All serious progress in the control of the disease dates from that year. The death rate dropped from 200 per 100,000 in 1904, to 46 in 1939, for the country at large.

The strategy outlined by Biggs is still fundamental: extermination of tuberculous cattle, education of the public, disinfection and prophylaxis. Part of this program has been successfully carried out in Massachusetts. Infected cattle are not tolerated and education is continuously disseminated among the laity. Ample hospital facilities have also been provided for the isolation and treatment of open cases and the contacts are generally examined as soon as discovered.

Yet, tuberculosis is not eradicated. It killed 1,500 citizens of our state last year. It is killing 1,500 more this year. Where are the sources of infection? Let us again follow the gauge of population density. The extensive surveys recently conducted by the Health Department of the City of New York are invaluable soundings into the various social strata. Once more they point to overcrowding as a reliable indicator. Clinically significant tuberculosis was discovered to be lower than one per cent in college students (0.2%); in high school students (0.4%); in NYA enrollees (0.9%); in fire department applicants (0.8%). The percentages rise sharply among the lower Harlem home relief recipients (2.9%) and among the inmates of Ricker's Island Prison (4.5%). It is highest in the transient and homeless men (5.3%). These figures which hold true for any sizable city throw some lights in the dark corners of our social structure. Overcrowding, like cough, is only a symptom. The latter means irritation in the bronchial tubes, the former indicates poverty in the community. Where there is poverty there is usually undernourishment and lowered resistance to infection. It is in this sense that tuberculosis has been called a social disease.

The spotlight can next be turned on sanatoria, general hospitals, and hospitals for the mentally ill, where there is overcrowding plus illness. The danger of infection is at a minimum for the patients themselves, who do not come into close and prolonged contact with their neighbors, but it is serious for their attendants. The hazards of nursing the sick were long overlooked. For the past fifteen years, however, one voice after another has been raised in warning. That of Heimbeck from the Oslo (Norway) General Hospital was among the first to be heard. He reported that one nurse out of eight (12.5%) developed tuberculosis in the course of her training. In Sweden, Hedwall found a mortality rate of 5.3% among the probationary nurses at the Lund University Hospital. Fisher, from California, and Geer, from Minnesota, discovered tuberculous lesions in 4.5% to 5.5% of the nurses. The incidence of infection is as high and sometimes higher in general hospitals than in sanatoria, for the simple reason that, in the former, tuberculosis is unrecognized and no precautions are taken. Prophylactic measures must go beyond the careful disposal of sputum and the disinfection of the rooms. Nurses and attendants should be instructed to wash their hands frequently and to wear gowns and masks. Systematic examinations for tuberculosis are now being conducted in most sanatoria. It seems, however, that general hospitals are slow to follow suit. Routine X-ray of the students and graduate nurses, orderlies and attendants would detect lesions in their early stages and save those employees months of illness. At the same time, a more alert watchfulness for symptoms and signs of tuberculosis among the patients themselves would reduce the hazards of contamination.

The trail of infection can also be followed to certain types of occupations. Tuberculosis mortality is higher among miners than among farmers; granite cutters, sand blasters, grinders, and others whose work exposes them for long periods to high concentrations of silica dust experience a rate some ten times that of the general population.

Tracking down tuberculosis into its last refuge is only one half of our task. The other half is to destroy the refuge itself. This is a vast undertaking. Prophylaxis in this field attains such amplitude that it merges into the realm of socialism, a socialism of the best brand such as slum clearance and unemployment insurance. The powerful efforts already made in that direction offer hope of a continued decline in the death rate.

Our optimism must not, however, blind us to possible reverses. The uncertainties of the postwar period are ahead of us. The lean years that followed in the wake of the preceding world upheaval taught us severe lessons not soon to be forgotten. Poverty reigned with its necessary accompaniments: overcrowding and malnutrition. Unable to pay for sufficient space, families gathered into small quarters where they pooled their resources but where they also shared their destitution and their communicable diseases. Fortunately, these adverse conditions were not sufficiently severe nor sufficiently prolonged to check the downward trend of tuberculosis mortality in the United States as a whole, but the deleterious effects of economic depressions on the health of the populations have been observed too often in Europe to need further proof.

Paradoxically, the unprecedented wave of prosperity on which we are riding at present is bringing about similar conditions. At this very moment, slums of a new kind are mushrooming around defense areas. Trailers, shacks and tents seem to come out of the ground to form settlements that defy description. They create an immediate problem for public health authorities. Today, wages are high and nutrition adequate. But what about tomorrow? Planning is all the more imperative at this time when tuberculosis is again on the increase in Europe.

The general malnutrition of the occupied countries and the prolonged starvation in the concentration camps, already taking a heavy toll, promise appalling hecatombs for the next decade. Latent tuberculosis, still present in over 50% of our population, as proved by autopsies, is ready to break loose at the first opportunity. To keep it in check, sanitary conditions must be adequate. All cannot be rich but all may expect sufficient food, proper rest, adequate light, and livable space.

Next, ceaseless watch is to be maintained on the avenues along which the tubercle bacillus travels. This means isolation of open cases, periodical examination of contacts, relentless search among suspected groups and among those whose occupations constitute a hazard. The occasional open case living at home must be surrounded by a strict aseptic technique: burning of the sputum, avoidance of direct contact, boiling of utensils and, above all, meticulous cleanliness.

If military preparedness is necessary to stave off attacks from without, then economic planning, social readjustments and effective prophylaxis are indispensable to prevent internal stress and to stem the ever-menacing tide of disease within.

TUBERCULOSIS EPIDEMICS IN HOUSEHOLDS

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Acting Superintendent, Lakeville State Sanatorium

"Consumption with its chills and pains
Doth but fulfill what God ordains"—1851.

This brief epitaph was copied from the headstone of a grave in a little country cemetery in western Massachusetts. It represents the extent of the knowledge regarding tuberculosis and its cause at that period. Four score and ten years ago, tuberculosis was thought to be a hereditary disease because it "ran in families." The theory of hereditary transmission was readily accepted until long after Koch's discovery of the tubercle bacillus in 1882. As a matter of fact, there are a surprisingly large number of people among the general population and even some among the medical profession who still express profound belief in the hereditary transmission of tuberculosis.

Where it not for the fundamental science of bacteriology it would have been difficult indeed to disprove this theory. Through the discovery of the tubercle bacillus and the fulfillment of Koch's postulates we were given the precise tool by which it was possible to classify tuberculosis as an infectious disease and evolve its epidemiology.

One attack of typhoid fever will generally confer immunity while infection with the tubercle bacillus does not produce substantial immunity to tuberculosis. This lack of specific immunity following infection has proved to be a major stumbling block to those persons engaged in the prevention of the disease.

The decline in the death rate from tuberculosis is confusing if we attempt to explain it entirely on the basis of scientific control and preventive measures which have been developed during the past fifty years. The death rate from tuberculosis in Massachusetts began to decline 25 to 30 years before the tubercle bacillus was discovered in 1882. The decline has continued steadily except for a slight rise during and following World War I.

Since the death rate is based upon the number of deaths from tuberculosis in a given unit of population let us analyze its possible effect upon the course of the disease in a community and then magnify these effects ten-thousand fold and see what the result might be in a nation.

Next to birth, death is considered to be the most important single event occurring in any person's sojourn in this universe. A death from tuberculosis marks the elimination of one of the sources through which subsequent cases of the disease might have had their inception. Death from tuberculosis may and often does mark the end of a series of cases within a household which would have been responsible for the dissemination of infection and disease to future generations. Household epidemics of tuberculosis have been terminated by the death of the affected members who served as "carriers" of the disease from one generation to the next. It is quite possible to reconstruct a family epidemic of tuberculosis using only recorded deaths from the disease.

The age at which death occurs as a result of tuberculosis has also had its effect upon the trend of the disease in the household and community as a whole.

The household epidemic which follows was obtained from the records of one of the oldest churches in western Massachusetts. In this particular parish the dates of births, marriages and deaths (with the cause of death) of the parishioners have been recorded in chronological order since 1817. These records are all the more impressive because they were made when the tuberculosis death rate was at its peak in this country. The true picture and epidemic characteristics of the disease are revealed, unaffected by changes in the standard of living or the modern methods of treatment and control which have been developed during the past half century.

The family roster was worked out as follows:

Isaac, Sr., and Thankful, husband and wife, were the parents of three children, Isaac, Jr., the eldest, Jared and Benajah, the youngest. The mother, Thankful, died from consumption July 24, 1825, and Benajah, the youngest son, died January 23, 1823, of "galloping consumption."

Jared, the second son, was married to Mary (I). To this union there were five children born—Sofie, Julia, Mary (II), Henry, and Nancy, in that order. Mary (I), wife of Jared, died of consumption September 4, 1825, and the four girls, Sophie, Julia, Mary (II), and Nancy, died from consumption between August 24, 1825, and January 23, 1834.

In 1830 Henry, son of Jared and Mary (I), a grandson of Isaac, Sr., and Thankful, married Pamelia who died from consumption January 23, 1840. To this marriage one son was born who died in infancy of brain fever, January 9, 1832.

In this family the disease was manifest in four generations and according to the church records was responsible for eight deaths and probably a ninth. The latter was the infant, son of Henry and Pamelia, whose cause of death was recorded as "brain fever." The other deaths were described as consumption and "quick consumption."

As far as could be determined from the church records there were only 13 persons that could be definitely affixed to this family. If this actually represents the entire household then the death rate was excessively high.

The significance of age at the time of contact is illustrated by this household epidemic. The age at the time of death ranged from infancy to 60 years. Six of the deaths, however, occurred between the ages of 14 and 27 years. Thus the importance of age in the susceptibility to the disease is illustrated. Five of those who died were females between the ages of 14 and 27. Their untimely death undoubtedly forestalled their marriage and prevented infection and probably disease among the children they might have borne.

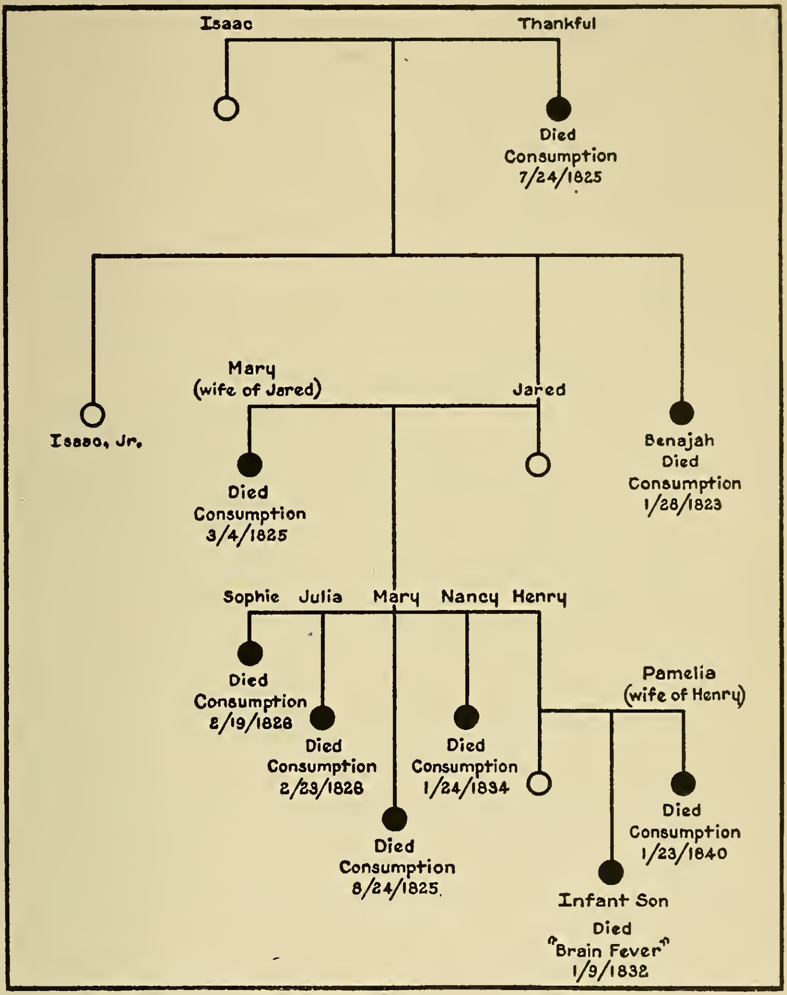
The importance of intimate contact through more or less continuous exposure within four walls is borne out as well as the effect of dosage or amount of exposure on the occurrence of tuberculosis. As women nowadays bear the burden of caring for the sick, it is reasonable to suppose that they bore this same burden a hundred years ago. In so doing they must have received an enormous dosage of tubercle bacilli and this factor alone probably played a very important role in the course of the disease in this family group.

We do not have conclusive proof that all persons in this family group resided under a single roof. However, it was the custom in those days to build an extra room on the house each time a son took a wife. The remains of the long rambling houses reminiscent of these early days may yet be seen in the hills of western Massachusetts.

The household epidemic just described is not unusual but was more common a half century ago. If we consider these household epidemics in respect to the country as a whole we must conclude that they have been responsible to a considerable degree for the decline of tuberculosis.

There is a certain analogy between the decline of tuberculosis and the law of diminishing returns, namely, that death from tuberculosis occurring at an excessive rate and before maturity is reached will result in fewer cases of tuberculosis in subsequent generations, because it cuts short the opportunity for spread of the disease.

"SPREAD OF TUBERCULOSIS FOUR GENERATIONS"


Isaac
Thankful
Died Consumption 7/24/1825
Isaac, Jr.
Mary (wife of Jared)
Jared
Died Consumption 3/4/1825
Benajah Died Consumption 1/28/1823
Sophie
Julia
Mary
Nancy
Henry
Died Consumption 8/19/1828
Died Consumption 2/23/1828
Died Consumption 8/24/1825
Died Consumption 1/24/1834
Pamelia (wife of Henry)
Died Consumption 1/23/1840
Infant Son Died "Brain Fever" 1/9/1832

THE SOLDIER RECEIVES AN X-RAY OF THE CHEST

David Zacks, M.D.
Chief of Clinics, Division of Tuberculosis
Massachusetts Department of Public Health

There is no longer any difference of opinion by those competent to judge as to the necessity for a chest X-ray in order to exclude tuberculosis in any thorough physical examination. In November, 1940, when the Army started induction under the Selective Service Act, a routine X-ray of the chest was required for each selectee. Since the Army Medical Corps was not ready with equipment and personnel to X-ray the men, the Department of Public Health through the Director of the Tuberculosis Division offered the services of its clinic equipment and personnel to fill in the gap.

The routine work of the Clinic Unit in the Tuberculosis Division consists of high school, college, reclassification and consultation clinics held throughout the State. In November, 1940, the Clinic was committed to a full program of work for the fall and winter when we were suddenly called upon to X-ray the men of the Yankee Division before their induction into the service as well as men called to the three induction centers at Boston, Worcester, and Springfield during induction periods.

The State Clinic employs three full-time X-ray field technicians each with a 10 milliampere portable X-ray machine, and one full-time darkroom technician stationed at Westfield State Sanatorium. Additional personnel required for the Army work included one X-ray field technician for six months and one assistant in the darkroom at Westfield. The darkroom facilities of the North Reading State Sanatorium were also utilized during the month of December. NYA boys (two for each field unit) helped with the numbering of the films and the writing of the film identification blanks which were made out in triplicate. Six WPA workers—four at Westfield and two at Boston—helped with the arranging of the films for shipping and with the filing of the identification slips.

At this time the men of the 26th Division, Massachusetts National Guard, were called to active duty by the President. These men were allowed to continue in civilian life until Camp Edwards was ready to receive them about January 1, 1941. There were about thirty days allowed in which to X-ray approximately ten thousand men of the National Guard scattered throughout the State. These men had their drill nights in armories of fifty communities. The Boston armories, where the largest number of men drilled, were not equipped with alternating electric current suitable for the portable X-ray machines.

The first and obvious plan was to X-ray the National Guardsmen on their regular drill nights. Time, however, would not allow the completion of the work by December 23 if this schedule were followed, with the limited number of X-ray units at our disposal. Accordingly, permission was obtained from the Surgeon-General to have the men assemble in the armories on other evenings according to schedule, in order to carry through the program between November 25 and December 23. Later, when it became evident that Camp Edwards would not be ready to receive the men before January 16, the original schedule was rearranged and extended to January 14, which gave us thirteen additional nights for the work.

On account of the lack of an alternating current line at the Boston armories, permission was obtained from Dr. G. Lynde Gately, Health Commissioner for the City of Boston, to use one of the Boston Health Units for this work. Dr. Gately also assigned an X-ray technician to take the films. This technician X-rayed the Boston Companies—about 2,600 men—and 600 men of the first draft call. These films were processed and interpreted by our workers, like those taken by our own field units. The selectees, after their regular induction examinations at the Irvington Street Armory, were transported in small groups to the East Concord Street Health Unit for X-raying. This procedure did not work out well because of difficulty in transporting the men and was finally discontinued at the request of Army authorities. For the December draft call and for subsequent calls the

Massachusetts Department of Public Health installed one of our portable X-ray units with a rotary converter to provide alternating current at the Irvington Street Armory and later, when the new center was established, at Selective Service Headquarters, 269 Columbus Avenue, Boston.

The Salem and some of the Lawrence Companies of the National Guard were X-rayed by the technician from Essex County Sanatorium. The technician from Worcester County Sanatorium X-rayed the Webster, Clinton, Gardner, Fitchburg and two of the Worcester Companies of the National Guard. These films were also handled routinely with the other films taken by the State units. Throughout the month of December, from four to six X-ray units were in the field working nights and some Sundays. From January 2 to January 10, seven units were in the field—three X-raying selectees during the daytime at the induction centers at Boston, Worcester and Springfield, while four others continued with the X-raying of the National Guardsmen at night. After the X-raying of the National Guard was completed on January 14, three units continued to X-ray selectees and volunteers for Regular Army enlistment until April 14, when the Induction Center at Worcester was discontinued.

The exposed X-ray films were immediately shipped by Railway Express to the State Sanatorium at Westfield or North Reading for developing. After they had been processed they were returned to the State House for interpretation. The great majority of the films was viewed by the Chief of Clinics and a few by the Assistant Director of the Division, Dr. Sartwell. Films of the National Guard Companies in western Massachusetts, as well as those taken at the Springfield Induction Center, were read by Dr. Morgan, Superintendent, and Dr. Luther, Assistant Superintendent, of the Westfield State Sanatorium.

Identification slips were made out in triplicate at the time of X-raying in the field. The original copy of each slip was sent to Camp Devens or Camp Edwards and constituted the report of our findings to the Army. The second copy of the slip was filed at the State House in alphabetical order. The third copy was filed in numerical order at Westfield State Sanatorium where the films were also filed. There were many and repeated requests for X-ray reports on the part of the Army doctors and we were able to give these reports or to loan films on very short notice.

The individual reports on selectees, as well as the statistical reports which were made out for each day's X-raying, were sent from the State House to the receiving camps usually on the fourth day after the films were taken. This unavoidable delay in reporting our findings was the greatest drawback encountered. The report of his X-ray caught up with the soldier several days after he had arrived at camp. In some instances, by the time our report reached the receiving station, the soldier had already been transferred to another camp. This occasioned a delay before the tuberculous soldier was finally given a medical discharge. This difficulty has now been overcome.

Two units continued to X-ray selectees and Regular Army volunteers at the Boston and Springfield Induction Centers through June. The Boston Center was finally ready to take over the work in July but one of our units continued to function at the Springfield Induction Center through September. In October this Induction Center was also ready to take over with Army equipment and personnel, and the State Health Department withdrew after having provided the Army with its services for about one year.

The Boston and Springfield examination centers are now fully equipped with fluoro-photographic units taking 4 x 5 inch stereoscopic films. With this equipment the induction center can expose, develop and interpret films on the same day so that rejection for tuberculosis is possible before the recruit leaves for camp. Before the setup was ready at the Boston Induction Center, Captain George O. Pratt of the Army Medical Corps and the writer visited Iola Sanatorium at Rochester, New York, to study a fluoro-photographic unit in actual operation. In the setting up of the Boston unit as well as in planning for the darkroom, we gave such advice and assistance as we could and trust that this has proven of some benefit to those in charge of the Induction Center.

These were busy days for all of us on the Clinic Staff. There was a splendid esprit de corps on the part of technicians and clerical workers who bore the brunt of the extra work. I should like to thank them all heartily. Thanks is also due to the Boston Health Commissioner, Dr. G. Lynde Gately; to Dr. George T. O'Donnell, Director of the Boston Division of Tuberculosis; to Dr. O. S. Pettingill and the Essex County Commissioners; to Dr. E. W. Glidden and the Worcester County Commissioners for their unhesitating help. Mr. Campbell of the Campbell X-ray Corporation and Mr. George Struck of the Eastman Kodak Company gave valuable technical assistance for which we are grateful.

The result of this mass X-raying for the discovery of pulmonary tuberculosis is presented in the following three tables. A total of 34,553 men were X-rayed, mostly during January, February, and March 1941.

Rejection for military service was recommended when evidence of pulmonary tuberculosis was found on X-ray. A very rough classification of cases into "active" and "healed" groups was made on the basis of X-ray findings alone. Cases whose X-rays showed less definite evidence of pathology were called pulmonary suspects and referred for further study. Calcified childhood-type or first infection lesions were not recorded as a reason for rejection unless they were of remarkable size or number. Pleurisy with effusion was a cause for rejection but residual evidence of old pleurisy with effusion as shown by an obliterated costophrenic angle was a basis for rejection only when inquiry revealed that definite pleurisy with effusion had occurred within five years previous to the examination. Obviously, mistakes were bound to occur when a classification had to be made on a single X-ray film without opportunity for special study; for example, a few of the men rejected may have had acute respiratory conditions which subsequently cleared up completely. Nevertheless, all these men had pathology which required, at the very least, further observation and study.

All of these cases found by the X-ray had been passed by the local Draft Boards and all but two or three were also passed by the Induction Board on physical examination. All of the pulmonary cases have been reported to their local boards of health as well as to the Army Medical Corps and are being followed up by the State District Health Officers and local nurses. When indicated their contacts are also being examined.

On reference to Tables I to III, it will be seen that 189 cases of pulmonary tuberculosis were discovered out of 34,553 X-rayed—an incidence of 5.5 per thousand men X-rayed. In interpreting these figures it should be remembered that a few men had already been rejected by local Draft Boards because of obvious evidence of tuberculosis or a verified history of the disease. It will be noted that the frequency was very much higher among negroes than whites. A further analysis of the National Guardsmen has shown that the incidence of tuberculosis rose steadily with age, being highest in the group over forty. When the men coming from urban communities were compared with those from the country, no particular difference was found. Twenty-three of the National Guardsmen with tuberculosis were in the minimal stage; seven were moderately advanced; and one was far advanced. Calcified parenchymal or tracheobronchial foci, indicative of healed primary infections, were found with a frequency of 29 per 1,000 white members and a frequency of 85 per 1,000 colored members of the National Guard.

Table I.

Massachusetts National Guard: Findings on Chest X-Ray Before Induction into Service

November, 1940-January, 1941

	White		*Colored*		*Combined*	
	No.	Incidence per 1,000	No.	Incidence per 1,000	No.	Incidence per 1,000
Films taken and interpreted	9,291		541		9,832	
Pulmonary tuberculosis	21	2.3	10	18.5	31	3.2
Pulmonary tuberculosis healed	12	1.3	2	3.7	14	1.4
Total tuberculosis	33	3.6	12	22.2	45	4.6
Tuberculosis suspect	7	0.8	2	3.7	9	0.9
Nontuberculous disease (cardiac, pulmonary, etc.)	29	3.1	5	9.2	34	3.5

Table II.

Regular Army: Findings on Chest X-Ray of Volunteers for Enlistment

March-September, 1941

	No.	Incidence per 1,000
Films taken and interpreted	1,896	
Pulmonary tuberculosis (active and healed)	9	4.7
Tuberculosis suspect	3	1.6
Nontuberculous disease	3	1.6

Table III.

Men Examined at Induction Stations Under Selective Service Act: Findings on Chest X-Ray

November, 1940-September, 1941

	No.	Incidence per 1,000
Films taken and interpreted	22,825	
Pulmonary tuberculosis	103	4.5
Pulmonary tuberculosis healed	32	1.4
Total tuberculosis	135	5.9
Tuberculosis suspect	37	1.6
Nontuberculous disease (cardiac, pulmonary, etc.)	44	1.9

MORE REALISTIC TUBERCULOSIS EDUCATION

Elna I. Perkins

Educational Secretary, Massachusetts Tuberculosis League

Although the 1941 figures cannot be stated at the time this is written, tuberculosis appears to have taken a higher toll in Massachusetts than in 1940. Evidence that the disease is on the increase in many parts of the United States, as well as in European countries is already at hand and we are faced with the question of what can be done about it. Although it is not an unexpected consequence of war and preparation for war we can no more accept the fact without planning for increased efforts for prevention than we can expect the military leaders and civilians in this country to be complacent about the increase of venereal diseases in the new Army.

The campaign to control syphilis and gonorrhea started by Surgeon-General Thomas Parran five years ago and carried on by the U. S. Public Health Service with undiminished vigor has been highly successful. The issue has been squarely faced without the inertia seen in previous weak control programs. It would seem that the time is ripe for an equally strong campaign to convince all citizens that it will be much less expensive to concentrate on the control of tuberculosis now than to go on with programs which are not sufficiently effective.

Education Precedes All New Programs

Whatever method of attack may be decided upon by the various agencies concerned in Massachusetts, we can be sure that more education will be necessary in order to show both community leaders and the public that it is needed. In reviewing successes and failures of some projects that have been tried in Massachusetts it is readily apparent in many instances that a thorough educational approach was largely responsible for success, and in others that lack of an adequate educational campaign could be blamed for failure. In earlier years the value of health education was not generally appreciated but tuberculosis workers were among the first to use it.

Evidence of Successful Education

Perhaps the best evidence we have in Massachusetts that education really works if given full opportunity is the yearly improvement in acceptance of the tuberculin test for pupils in school clinics. Teachers' increasing acceptance of the chance to have a free chest X-ray is also indicative of effective education. In recent years considerable time and effort has been given by the school clinic workers, school personnel, and tuberculosis association workers in educating all teachers and pupils on the purposes and values of the school tuberculosis program. Instructive teaching materials for classroom use; demonstrations and sound films in assemblies; meetings and letters for parents; exhibits in school halls and libraries and in public places in the community, and newspaper publicity—all have been used. It is not true that the accumulative effect of school clinics held since 1924 would alone bring about this result; for in places where the results of school clinics had been consistently poor, a more energetic educational program staged well in advance of the clinic has succeeded in one year in adding large percentages of consents.

Older Adults Need Education

In similar manner special case-finding programs for adults require a carefully planned introductory educational campaign, if wholehearted cooperation is desired. We cannot yet assume that the schools' work in tuberculosis instruction has been done adequately and consistently over a long enough time to affect the attitudes of older adults toward tuberculosis; but it is now evident that young people who have been in high school and college in the past decade know much more about the disease than the older generation.

Early Diagnosis Campaign

Tuberculosis associations give special attention to education during April each year when the Early Diagnosis Campaign is staged by them in cooperation with other agencies. It becomes clearer each year that this campaign will produce tangible results only if arrangements have been made to provide opportunity for earlier diagnosis. We can hardly expect that persons who have no reason to think that they have tuberculosis will go to a doctor's office or clinic every year for a chest X-ray to be sure that they do not have the disease, but we can expect that they would willingly have an X-ray at small or no cost if arrangements were made to include them in a mass survey. It is well, however, to plan an all-year-round Early Diagnosis Campaign where interest in this activity can be developed and maintained as an essential part of a community's tuberculosis program. By this we do not mean the routine following up of known contacts but the search for unsuspected cases among people apparently well.

Everyday Education for Patients and Their Families

Apart from special campaigns, everyday use can be found in the doctor's office, the clinic and the sanatorium for educational methods and materials. Although the doctor and the public health nurse may do much explaining to the patient before he enters the sanatorium, and the sanatorium doctors may continue telling each patient the facts of his condition, treatment, and progress as he needs to know them, there still may be some additional information or reinforcement that the patient can gather from pamphlets or books describing the disease.

We can be sure that the patient will derive satisfaction in showing his family the diagrams he has found in pamphlets illustrating pneumothorax as it was applied to him. Sound films on tuberculosis, rehabilitation, and other health subjects can be shown to ambulatory patients in sanatoria. Informal group teaching of these patients can be carried on with discussion of health fundamentals, such as nutrition, rest, and sanitation. Every sanatorium library should contain attractively written health books.

Training Schools

Further important places for tuberculosis education materials are in the schools and colleges training professional workers—such as hospital training schools, teachers colleges, colleges of physical education, schools of public health nursing, social work, and medicine. In the study of tuberculosis in these schools the importance of health education in its control should be emphasized. Literature and reprints are available to the faculty or students of such schools on request.

Health Departments

The health officer or board of health in each city and town has an unparalleled opportunity to educate the citizens of his community about the local tuberculosis situation—emphasizing both needs and accomplishments. The same publicity techniques and educational methods used by tuberculosis associations are applicable to the health department's program. There should be no question of duplication—the health officer and the tuberculosis association worker can easily sit down together to plan their programs so that each supplements the other and to arrange many joint enterprises.

Public health nurses have found our well-illustrated pamphlets very helpful in visiting homes to explain the need for sanatorium care as well as the precautions that must be taken to prevent infection of other members of the family.

Education and Rehabilitation

In one direction the tuberculosis control program in Massachusetts is already being enlarged, i.e., in the development of a systematic program of rehabilitation. The objects of this program are three-fold: (1) to help the patient while in the sanatorium to establish new interests and to complete or supplement his basic education; (2) when indicated, to start him on a course of training to fit him for the work he plans to take up after discharge; (3) to assist him in readjustment to his job or in securing work in a new field. In some cases this will require an extended training period after discharge from the sanatorium.

From the public health standpoint, this program helps to reduce the proportion of patients relapsing after discharge and so save lives and money as definitely as any other part of the tuberculosis control program.

Not only must public understanding of this new program be fostered, but ways must be devised to instruct patients in special phases of rehabilitation. For example, they should know what jobs, hobbies, and recreations are suitable and what educational opportunities are available to them.

Tuberculosis Associations Provide Materials

The National Tuberculosis Association still is among the leading health agencies in the development of most effective materials including pamphlets, posters, charts, slides, sound motion pictures, publicity kits, and reference materials on subject matter and methods for tuberculosis education. These materials can be supplied through the local and state associations. Requests should be made to the local or state associations rather than to the National Association.

THE CONTRIBUTION OF CONSULTATION CLINICS TO CASE FINDING AND TREATMENT

Helen C. Reilly, R.N.

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Massachusetts Department of Public Health

Diagnostic clinic service is one of the most important measures in the control of tuberculosis, and is essential for the effective use of the excellent sanatoria which Massachusetts provides.

Such a clinic, located in the Town of Athol, serves also a number of surrounding communities. Since its establishment in 1933, more than fifteen hundred persons have been examined. They come from Orange, Warwick, Wendell, Erving, New Salem, Phillipston, Royalston and Baldwinsville as well as Athol. The nearest similar clinic to the east is in Gardner; to the west, in Greenfield. This clinic is operated by the Athol Board of Health, working in close cooperation with local physicians, but it brings to Athol once each month tuberculosis specialists from a state sanatorium, a public health nurse, and an X-ray technician with portable equipment from the Department of Public Health, who give similar service elsewhere in Massachusetts. This particular clinic is held in the Athol Memorial Building on the fourth Wednesday of each month. The board of health nurse is in charge, aided by an assistant and a clerk whose services are paid for through the sale of Christmas seals. Its purpose is to enable those who have been in contact with tuberculosis, or who have suspicious symptoms, to obtain the thorough examination and X-ray essential to intelligent diagnosis and treatment; and to provide specialized medical supervision for patients discharged from sanatoria with arrested tuberculosis who live too far away to return to the sanatorium for examination.

A typical family record has been abstracted from our files to show how the local physician, board of health, sanatorium and tuberculosis association by working together can achieve best results in case-finding, treatment and family supervision.

Mrs. M., who lived in one of the adjacent rural towns, appeared at this clinic September 27, 1939. She was referred by the family physician, Dr. R., who practiced in another nearby community. The patient, age 41, gave no history of previous exposure to tuberculosis but complained of loss of forty pounds of weight, productive cough of three months' duration and wheezing. Her chest examination was negative. Because the X-ray was not working properly on this particular day—a rare experience, incidentally—no film could be taken. Through the courtesy of the executive secretary of the county tuberculosis association, who happened to be visiting the clinic, Mrs. M. was given transportation back to her home where the bus ran very infrequently. On account of the inability to secure a satisfactory X-ray, Dr. R. was asked to have Mrs. M. report to the next clinic. He readily agreed to this and the patient was brought back October 25, 1939, for X-ray which showed a ring shadow in the upper third of the left lung suggestive of a large cavity. A diagnosis of pulmonary tuberculosis was made and sanatorium treatment recommended. Dr. R. accepted the findings and recommendations, and made application for her admission to the Worcester County Sanatorium; she was admitted November 8, 1939. He also agreed to have the five children, whose ages ranged from four to fifteen, X-rayed and examined. Mrs. M.'s husband had died previously from accidental causes; the family received assistance through Aid to Dependent Children. Through the cooperation of social service, the A.D.C. visitor was informed of the diagnosis, recommendations for treatment, and plans for clinic attendance for the children. They have been X-rayed and examined annually and show no evidence of disease. The children's maternal aunt, who came to care for them in their mother's absence, and who had a slight cough, was also X-rayed with negative results. Dietary advice for the children was furnished her. Mrs. M. is still in the sanatorium. The superintendent reports her prognosis is favorable with continued treatment, but her sputum is still positive.

In addition to showing the value of cooperative efforts, this case demonstrates that X-rays are an essential part of any examination for tuberculosis. If arrangements had not been made to have this patient return for X-ray when the apparatus was working, the case would have been missed in spite of competent physical examination.

Another illustration of the combined efforts of family physician and local board of health in the interest of combating tuberculosis is taken from the records of the Milford Consultation Clinic held the second Wednesday of every month. Mr. E., age 42, from a neighboring town, was referred to the clinic by his private physician February 12, 1941. His chest was negative on physical examination; but the X-ray findings indicated pulmonary tuberculosis and sanatorium care was recommended. Mr. E. was admitted to the Worcester County Sanatorium in February, 1941. Through the courtesy and personal interest of the family physician and agent of the board of health, Mrs. E. and the seven children were brought to the next clinic and X-rayed and examined; all had negative X-rays. Mr. E. was discharged from the sanatorium August 10, 1941, his condition quiescent.

Another illustration of the combined efforts of industry, sanatoria and consultation clinic toward familial control of tuberculosis might be given. Mr. W., age 32, was employed at a factory in Southbridge. The industrial physician in the factory discovered in March, 1937, that Mr. W. had pulmonary tuberculosis with a positive sputum. The patient was admitted to the Tewksbury State Infirmary where he was given pneumothorax treatment. His attitude toward treatment was excellent. According to the social worker at the infirmary, Mr. W. lived for the day when he could be safely restored to his little family and work. When his sputums were repeatedly negative, the social worker asked the field nurse to arrange for pneumothorax refills after discharge. Accordingly, a summary of his medical record was sent to the Rutland State Sanatorium where the refills were given, as this was much nearer his home. In the meantime, the patient's wife was X-rayed at the Southbridge Consultation Clinic. In October, 1941, Mrs. W. brought in her small daughter for an X-ray and stated that her husband was working, pneumothorax had been discontinued and there was another addition to the happy little group.

While no cases have been cited from the Gardner consultation clinic, this is the oldest and one of the best of these clinics operated in the Rutland area.

It is to serve such families as these that tuberculosis consultation clinics exist.

THE SOCIAL WORKER IN THE TUBERCULOSIS PROGRAM

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The Commonwealth of Massachusetts is fortunate in its facilities for the care of tuberculous patients. With our twenty-two State, County, and Municipal Sanatoria providing over 4,000 beds, no patient requiring hospitalization need wait long before he can be cared for. The death rate has continuously declined over a long period. Dr. Chadwick in a paper "The Ten-year Program for Children—Progress and Plans" in the *New England Journal of Medicine* for May, 1929, stated that he expected that with intensified effort the death rate for all forms of tuberculosis in Massachusetts would be under 40 per 100,000 by 1939. This expectation has been realized. The 1940 figures show a rate of 37 per 100,000.

The aspect of tuberculosis to be discussed in this paper concerns the patients who for some reason or other need help in order to use these facilities. We do not have figures to show how many patients refuse treatment, or how many of those admitted to a sanatorium leave against medical advice. I have heard estimates ranging from 3% to as high as 30%.

To follow the prescribed treatment is a test of character even for the determined and self-sufficient person. It usually means entering a sanatorium for an indeterminate period. It involves a complete change from the usual way of life—family and home responsibilities, occupation, and recreation. No wonder that to many persons it at first seems impossible. Physicians have long recognized this dilemma for the patient and have called upon the social worker to help him face the implications of his diagnosis and find ways of meeting the personal and family problems which are created by it. To be sure, people do not have the dread of hospitals and sanatoria which they had formerly so that it cannot be said that the fear of entering a medical institution is often the deterring factor. Thanks to health education programs carried on by public health departments, medical societies, tuberculosis leagues, public health nurses and others there is fairly general recognition that modern treatment of tuberculosis requires sanatorium care. These are important advances made in the last decade. Many persons have the resources, outer and inner, to solve their personal problems without help; they have courage, stability, family understanding and support; in short they have "what it takes" to overcome their fears and to accept and adjust to a tuberculosis regime.

Let us turn our attention to the patients who must have help in order to be brought under care. What are the obstacles likely to be?

In the first place there is the very practical problem of a long illness involving usually at least a year and often several years of separation from family life.

If the patient is the bread winner, provision must be made for his family. If it is the wife, the children may need to be placed either with relatives or in a foster home. Sometimes the patient is a boy or girl attacked before the completion of his education or just at the beginning of a job. It is no wonder that physicians early saw that their treatment would be ineffective unless the social obstacles to the patient's acceptance of treatment could be relieved. Moreover, they saw that even if the patient allowed himself to be persuaded to enter the sanatorium either he was apt to leave too soon against advice or he became so tense with anxiety about what was happening at home that he was incapable of real rest. As one sanatorium superintendent expressed it, some patients although apparently lying quiet in bed have an engine racing sixty miles an hour inside them driven by fears and home anxieties, and no medical treatment can do much for them until something can be done to slow down the engine. Tuberculosis is a disease which requires rest from all activities, physical, social, and mental.

There are three stages in the course of treatment when physicians call upon the social worker for assistance. As one tuberculosis specialist put it to me, "Help them to use the facilities, especially the sanatorium. Help keep them in the sanatorium. Help them when they leave the sanatorium." To accept and remain under treatment patients must know that their families are being cared for. Economic security must be assured. Here is a not uncommon situation:

Mr. A., an Italian forty years old, could not make up his mind to come into the sanatorium. The clinic physician explained to him the diagnosis of pulmonary tuberculosis and asked the medical social worker to talk with him and help arrange for hospitalization. The patient told them both that he did not feel particularly ill, just tired, and he did not see how he could give up his job and leave his wife and four young children. He explained to the social worker how dependent they were on him. His wife did not speak or understand English well and had always left the management of the household to him. She had never even bought her own groceries. How could he leave even if financial provision could be made for them? He could take all necessary precautions at home and be there to direct affairs. The social worker listened and sympathized but pointed out the dangers of such a plan and gradually got him to think of other possibilities. Before he left the clinic he had begun to see a way out through enlisting the help of his mother who might be able to come from a nearby town and stay with his wife. If something could be done about the loss of income, he would see about the rest. The help of the visitor from the local Board of Public Welfare was obtained in getting a grant from funds for Aid to Dependent Children, Mr. A's plan of enlisting his mother's help worked out, the public health nurse began visiting and the patient left for the sanatorium.

Many times this may be all the help a patient needs. Once he is assured that his family is cared for he learns to adjust to sanatorium life and the next major readjustment will not come until he is ready to leave the sanatorium, his condition arrested. In Mr. A's case the need arose sooner. He started out well and was apparently fitting into the sanatorium regime. Then after a month or so the physician noticed that he seemed anxious and depressed, so tense that cooperation in treatment seemed impossible. He looked like one of the patients mentioned above whose internal engine was racing at full speed. The social worker was asked to talk with him. Outwardly, the picture presented to her was that of a man lying quietly in bed. On closer observation she saw in his strained expression and the repressed excitement of his speech that he was laboring under great inner tension. Because of his previous contact with the medical social worker in the clinic he had some understanding of her role and soon talked freely.

For the first few weeks after he was admitted he heard from his wife almost every day. He had been a little anxious because the extra money expected from the Aid to Dependent Children Funds had not begun, but he knew that took time and his mother was standing by. Then suddenly the letters had stopped coming. He had not heard a word for almost three weeks. One could see the thoughts that were whirling through his head. Some were expressed, others only hinted at. Was she sick? Were the children sick? Were they getting enough to eat? Was his wife becoming used to his absence and beginning to forget him? He must go home and see. He had doubted all along whether they could manage without him. He had been planning how to tell the doctor that he must leave and to ask for his clothes. As so often is the case the mere telling of his story relieved him a little. The social worker, however, was able to promise an immediate visit to his family and a report to him. It turned out that his wife had been ill and had been in the hospital a few days, partly as a result, her physician suspected, of her own worries and unaccustomed responsibilities. No one had written Mr. A., not wishing to worry him. It is interesting that though the social worker's first report told him of his wife's illness, yet the very fact that he was again in direct contact with his home satisfied him. The truth was not as hard to bear as his fears had been. The social worker got in touch with the public health nurse who already knew the family but did not know of Mrs. A's illness, and also with the local Board of Public Welfare. The result was that the family situation was more adequately cared for. When the social worker saw the patient on the ward a week later, he remarked smilingly to her, "I don't know what you did to them, but I hear from them every day now and my brother has been to see me, too."

One of the important points to notice in Mr. A's case is the continuity of service. The clinic physician made use of the social worker to help the patient with the initial adjustments. The clinic social worker passed on to the sanatorium the information which would give the physician and the social worker there an understanding of his problems. And the sanatorium physician called in the social worker to help with the new problems.

This case also illustrates the importance of bridging the gap between the sanatorium patient and his family and helping to maintain and strengthen family ties. When the patient is a young mother with children we find similar fears and anxieties centering on husband and children who may not be receiving proper care or who may be growing away from her. Naturally, she cannot rest in the sanatorium and furthermore she will not stay unless her worries about adequate supervision for her children can be relieved.

"Help them when they leave the sanatorium." This means knowing what the home situation is and preparing the family for the patient's homecoming by interpretation of his further needs to them. It means cooperation of community health and welfare agencies so that their combined services are available to help the discharged patient in his readjustment to life in the community. In the case of children there are times when return to their crowded homes seems too great a hazard and placement for a further period of convalescence through a children's agency needs to be arranged.

The impetus being given to the problem of vocational rehabilitation of the tuberculous through activities of the National, State and local Tuberculosis Associations is one of the significant advances of recent years. Rehabilitation agents have been assigned to a number of sanatoria in Massachusetts to help with vocational advice to the patient who will be employable but is unable to return to his former occupation. Some report encouraging success in obtaining job opportunities for discharged patients. This service as well as the increasing use in sanatoria of trained hospital librarians and occupational therapists is a sign of the greater emphasis on the social needs of tuberculous patients. We do not yet have anywhere a centre which has completely developed all of these services, but their value in relieving tension and in helping the patient stay out his time in the sanatorium is being more widely recognized.

In view of the increasing adequacy of care for our tuberculous in terms of advance in medical knowledge and skill, sanatorium provisions, diagnostic clinics and public health nursing, education and follow up, is it not possible that the gains in the next decade must come, to a greater extent, through a growing concentration on understanding the personal and social aspects in relation to the individual patient? And does this not mean an increasing use of the social worker?

THE ROLE OF THE BACTERIOLOGICAL LABORATORY IN THE DIAGNOSIS OF TUBERCULOSIS

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The tubercle bacillus was one of the first pathogenic bacteria isolated and cultivated during that notable decade of the rise of bacteriology, 1880-1890. It was isolated by Robert Koch in 1882 from tuberculous tissues from various sources. Other workers had seen the bacilli in tissue sections but had not cultivated the organism.

One early observation was that the bacillus did not stain readily with the usual aniline dyes but when it was finally stained it retained the dye after treatment with acid alcohol. The Ziehl-Neelsen method of staining was described in 1882-83 and probably still remains the method of choice in the majority of laboratories. On account of the resistance of the tubercle bacillus to decolorization, it, with many other bacilli of similar property, belongs to the acid-fast group of bacilli. The leprosy bacillus is also in this group but the majority of acid-fast bacilli are not pathogenic and are widespread in nature. This fact should be borne in mind whenever a laboratory report is made of acid-fast bacilli based on morphology and staining reaction only. Usually, acid-fast bacilli seen in sputum are actually Mycobacterium tuberculosis; and attempts to prove their pathogenicity would be, in most instances, impractical, on account of the length of time necessary to furnish such proof. However, if there is a reasonable doubt, in certain cases specimens of sputum are inoculated into guinea pigs in order to obtain definite proof of the identity of the bacillus. Specimens other than sputum, such as urine, gastric washings, pleural, peritoneal, and spinal fluids, etc., are usually examined by cultural tests and animal inoculation. This is done for one of two reasons, either (1) there is a possibility of the presence of other acid-fast bacilli; or (2) the tubercle bacilli may be present in too small numbers to be seen by direct microscopic examination.

It should again be emphasized that while the presence of acid-fast bacilli in a smear from sputum is usually considered proof of tuberculosis, further investigation should be made before reporting such a case as one of pulmonary tuberculosis in the rare instances where the X-rays are negative, as we may be dealing with adventitious nonpathogenic acid-fast bacilli.

The new fluorescence method for the detection of tubercle bacilli was described by Hagemann in 1937 and reports were made in Germany, Italy, Holland and elsewhere of its value. In January, 1941, Richards and Miller described their apparatus and method in the *American Journal of Clinical Pathology.* By the use of this method, the examination of a larger amount of the specimen in a relatively shorter time than by the older microscopic methods is possible. The smear stained with a fluorescent dye, auramine, is examined with a microscope equipped with fluorescence accessories. Acid-fast organisms, thus stained, when viewed by ultraviolet light appear luminous in a nearly black field. Bacilli which might have been missed by the Ziehl-Neelsen method are more apparent and since a lower magnification can be used, more of the preparation can be examined in a shorter time than when the oil immersion lens is required. If this method proves to be as valuable as preliminary reports would indicate, its use will probably increase the percentage of positives found. However, it will not enable one to differentiate between tubercle and other acid-fast bacilli any better than the older microscopic methods.

Methods used by the Bacteriological Laboratory of this Department are briefly described below.

Sputum Examination by Stained Smear:

Selected particles are smeared on a glass slide and stained by the Ziehl-Neelsen method, with methylene blue as the counterstain. If acid-fast bacilli, typical in morphology for the tubercle bacillus, are seen, a report is made of the presence of "acid-fast bacilli." Specimens apparently negative are examined for fifteen minutes before a negative report is made. It is suggested that further specimens of sputum be submitted if clinical symptoms persist.

If specimens are repeatedly negative, sputa may be submitted for concentration. The sputum is concentrated by the use of Tergitol or Caroid and smears of the sediment are stained by the Ziehl-Neelsen or the fluorescence method.

Cultivation and Guinea Pig Inoculation:

As has been stated, specimens other than sputum (and occasionally sputum) are examined by cultural tests and guinea pig inoculation. Such specimens should be sent in sterile containers with no disinfectant whatever. The sediments from these specimens, after appropriate preliminary treatment for concentration and destruction of contaminating organisms, are cultivated on several special egg media, such as those of Petragnani, Loewenstein, Steenken and Corper. The cultures are incubated for eight weeks and examined weekly for growth. When any growth of acid-fast bacilli is found, a guinea pig is inoculated with a suspension of the organism in order to prove the virulence of the bacillus. In an occasional spinal fluid the tubercle bacilli may be found in the fibrin web or sediment if a prolonged search is made of a direct smear and an immediate report may be made. Certain specimens which are likely to contain many other bacteria, as feces, are inoculated directly into guinea pigs with no preliminary cultivation. Neither the cultural method nor guinea pig inoculation is without difficulties, as cultures may be overgrown by contaminating bacteria and molds, and guinea pigs may die of some acute infection before there has been time for lesions of tuberculosis to develop.

The weak points of both methods have been studied. Preliminary treatment of contaminated specimens with acid or alkali increases the survival time of the inoculated guinea pigs but the loss is still great. Limited animal quarters preclude the possibility of inoculating two or more pigs for each specimen.

In order to make conditions as favorable as possible in the cultural method, the pH of medium and inoculum is adjusted to 6.4-6.8, the optimum for tubercle bacilli. Moisture is retained by corking the tubes tightly.

The chemicals used for the preliminary treatment of specimens are commonly 3% hydrochloric acid and fairly strong alkali. These undoubtedly have some tuberculostatic effect; for this reason as many specimens as possible are used untreated. Care exercised in the collection of specimens would reduce the difficulties with contaminating bacteria.

Comparative tests made with treated and untreated specimens gave more positive results with the untreated specimens. The alkali treated specimens, especially, showed a time lag and fewer colonies in cultures. The newer Tergitol digestant which contains NaOH has the same disadvantage for cultures but is very useful for concentration when smears only are to be examined, as its digestive action is quick and complete and permits the use of the whole sediment for the smear. The preparation Caroid which contains the enzyme papain is a still more promising digestant in that it does not contain NaOH to exert tuberculostatic action. Therefore, it is used for concentration followed by treatment with 3% HCl before cultivation.

Although there are failures by both cultivation and guinea pig inoculation there is a fairly close agreement in the percentage of positive results when comparative tests are made. For this reason, the laboratory uses the method which appears best suited to the individual specimen.

Suitable containers for specimens to be sent to the Bacteriological Laboratory may be obtained at Room 527 State House, Boston. Any Massachusetts physician may submit material for examination unless the patient lives in Boston or some other city having its own bacteriological laboratory; no charge is made for this service.

ANNOUNCEMENT

Office of Civilian Defense

Washington, D. C., December 8, 1941.

Members of the National Technological Civil Protection Committee, appointed by the Secretary of War in January, 1941, have agreed to act also as an Advisory Board on Sanitary and Public Health Engineering to the Medical Division of the Office of Civilian Defense.

The Office of Civilian Defense will have a contact member on this committee, as does the War Department. Ralph E. Tarbett, Senior Sanitary Engineer, U. S. Public Health Service, who has been assigned as chief sanitary engineer of the Medical Division of the Office of Civilian Defense with headquarters in the Washington office, will be the contact member for the Office of Civilian Defense.

Regional sanitary engineers are being appointed by the Medical Division to work through State Defense Councils with State health departments in planning defense against belligerent action; to promote development of protective measures for public water supplies; to consult with health authorities on emergency maintenance of sewerage, sanitary facilities, garbage disposal, and protection of food and milk supplies, in the event of a disaster.

Mr. John H. Brewster, at various times sanitary engineer for the American Waterworks and Electric Company and for the New York and Indiana State health departments, has been appointed a sanitary engineer in the Reserve of the Public Health Service and assigned to the First and Second Regions (New York, New Jersey, Delaware, and the New England States).

REPORT OF THE DIVISION OF FOOD AND DRUGS

(As required by General Laws, Chapter 111, Section 25)

During the months of April, May, June, July, August, and September, 1941, samples were collected in 404 cities and towns.

There were 3,620 samples of milk examined, of which 468 were below standard, from 35 samples the cream had been in part removed, and 28 samples contained added water. There were 3,781 bacteriological examinations made of milk, 2,850 of which complied with the requirements. There were 135 bacteriological examinations made of cream, 56 of which did not comply with the requirements; and 246 bacteriological examinations of ice cream, 44 of which did not comply with the requirements. There were 2 bacteriological examinations made of canned corned beef, 3 of chocolate milk, and 1 of a bottle, all of which complied with the requirements; and there were 7 bacteriological examinations made of sherbet, 24 of hamburg steak, and 22 of food colors. There were 28 bacteriological examinations made of mattress filling, 5 of which did not comply with the requirements.

There were 777 samples of food examined, 165 of which were adulterated. These consisted of 44 samples of clams which contained added water; 1 sample of butter which was below the legal standard in milk fat; 3 samples of cream, 1 of which was low in fat for the grade specified, 1 bore a cap upon which the grade was not designated, and 1 sample was not properly labeled; 3 samples of maple syrup which contained cane sugar; 2 samples of prunes which were infested with worms and beetles; 1 sample of rolled oats which contained weevils; 1 sample of soft drink which contained caffeine; 1 sample of wash water which was deficient in caustic alkali; 1 sample of decomposed broken out eggs which was being used in bakery products; 6 samples of cream cheese which did not conform to the legal standard; 2 samples of vinegar which contained less than 4.00% acetic acid; 21 samples of olive oil, 15 of which contained cottonseed oil, 4 contained peanut oil, and 1 contained a foreign oil; 1 sample of ground pork which was decomposed; 41 samples of sausage, 10 of which contained an excess of 2 per cent cereal or vegetable flour, 9 samples contained a compound of sulphur dioxide not so labeled, and 22 samples were decomposed; 10 samples of hamburg steak, 1 of which contained a compound of sulphur dioxide not so labeled, and 9 samples were decomposed and 1 also contained a compound of sulphur dioxide not so labeled; and 27 samples of bedding and upholstering materials, consisting of 21 samples of fibers, 2 samples of which contained a mixture of new and secondhand material which were not so labeled, 5 samples contained secondhand material 1 of which also contained oily sweepings, 3 samples contained oily sweepings and 1 also contained secondhand material, and 11 samples did not contain the material as specified; and 6 samples of feathers and down, all of which did not contain the material as specified.

There were 69 samples of drugs examined, of which 13 were adulterated. These consisted of 6 samples of saccharin and 7 samples of citrate of magnesia, all of which did not conform to the requirements of the U. S. Pharmacopoeia.

The police departments submitted 250 samples of liquor for examination. The police departments also submitted 29 samples to be analyzed for poison or drugs, consisting of 4 samples of white powder 3 of which contained heroin and 1 contained no narcotic drugs, 1 sample of pills contained morphine, 2 samples of brown paste contained opium, 1 sample of brown gum was found to be gum opium, 2 samples of white liquid, 1 of which was glacial acetic acid, and the other was amonium hydroxide, 1 sample of brown liquid was sulphuric acid, 6 samples of cigarettes, 4 of which contained cannabis and 2 were examined with negative results, 3 samples contained cannabis, 4 samples contained opium, 1 sample contained heroin; and 1 sample of pills, 1 sample of yellow powder, 1 sample of ham, and 1 sample of sour milk, were all examined for poison with negative results.

There were inspected 786 plants operated for the pasteurization of milk; 310 restaurants; 239 soft drink plants; 371 bakeries; 72 ice cream establishments; 2 sausage plants; 1 nut factory; 2 gum factories; and 536 mattress establishments. There were 62 drug stores inspected, principally in connection with an investigation of sulfathiazole.

There were 151 hearings held pertaining to violations of the laws.

There were 98 convictions pertaining to violations of the laws, $3,495 in fines being imposed.

Charles A. Bean of Sherborn; H. P. Hood and Sons, Incorporated, 2 cases, of Charlestown; Manuel Souza of Dartmouth; David Harper of Lancaster; Michael Dolinski of Westfield; Arthur Choiniere of Webster; and John Slosek and Charles H. Reynolds of Ludlow, were all convicted for violations of the pasteurization law and regulations. H. P. Hood and Sons, Incorporated, of Charlestown, appealed their two cases.

Mrs. Emma N. Jackson of Berkley; John Simard of Pelham; Joseph Medeiros of Taunton; Frank Munsell of Hampden; Anthony Mickewicz of North Wilmington; Frank G. Patch, 2 cases, of Wilmington; W. Henry Smith of Great Barrington; Green Parrott, Incorporated, of North Cambridge; Joseph Tumidajewicz, Jr. of Willimansett; Gowen Whitaker, 2 cases, of Chester; Edward J. Miller of Amherst; and Fenway Farms, Incorporated, of East Longmeadow, were all convicted for violations of the milk laws.

Week's Creamery, Incorporated, of Chicopee; Clover Leaf Dairy of Southbridge; Harry Hescock of Westfield; and Nathan Koblitz and Miller Rhinehart of Pittsfield, were all convicted for violations of the milk grading regulations.

George R. Dow of Salisbury; Jack Saletsky, I. W. Stavis, Colonial Provision Company, Incorporated, (doing business as State Sausage Company), Omaha Packing Company, Incorporated, Dominic Previte, J. Goldberg, Frank G. Willworth, John Gandolfo, and Philip Shwachman of Boston; Joseph Rapallo of Medford; Mohican Market, Incorporated, of Newton; Anthony Botticelli of Revere; Carl Savage of Rowley; William Alter and Terminal Markets, Incorporated, of Roxbury; Paul Cimini of Pittsfield; Consumer's Provision Company, Incorporated, and Fillameo Viscosi of Worcester; S. Mazzarelli and Sons, Incorporated, 2 cases, of Milford; Enrico Pasquale, 3 cases, J. S. Contas Brothers, Incorporated, and White Star Foods, Incorporated, of Waltham; Big Bear Meat Department, Incorporated, 2 cases, of Cambridge; Omaha Packing Company, Incorporated, of Lowell; Fred Moroni of Holyoke; Louis E. Vigeant of Southbridge; and Donald Dearo and Joseph Teti of Utica, New York, were all convicted for violations of the food laws. Jack Saletsky, Dominic Previte, and Frank G. Willworth of Boston; Anthony Botticelli of Revere; Consumer's Provision Company, Incorporated, of Worcester; and S. Mazzarelli and Sons, Incorporated, 1 case, of Milford, appealed their cases.

Bence Pharmacy, Incorporated, Greylock Confectionery Corporation, 2 cases, Harvard Grill Garden, Incorporated, Waldorf System, Incorporated, and Wursthaus Restaurant, Incorporated, of Cambridge; Bob Berger's, Incorporated, and Angelo Cataldo, 2 cases, of Boston; Pasquale Scollo, 2 cases, of North Reading; John E. Gillispie of Stoneham; and Louis E. Vigeant of Southbridge, were all convicted for violations of the sanitary food law. On Bence Pharmacy, Incorporated, of Cambridge, sentence was suspended until August 25, 1941, and on Greylock Confectionery Corporation, 2 cases, of Cambridge, sentence was suspended to November 10, 1941. Bob Berger's, Incorporated, and Angelo Cataldo, 2 cases, of Boston, appealed their cases.

Dominic Previte of Boston; Joseph Rapallo of Medford; S. Mazzarelli and Sons, Incorporated, of Milford; and Luciano Colicci of Providence, Rhode Island, were all convicted for misbranding. Dominic Previte of Boston, and S. Mazzarelli and Sons, Incorporated, of Milford, appealed their cases.

Walter Czerwonka of Fall River; George A. Davis Company of Gloucester; Dobbs Beverage Company of Leicester; Jacob Chruscial of Everett; and Thomas Beverage Company of Malden, were all convicted for violations of the soft drink law and regulations.

Harry Fishman, 2 cases, and John Sterman of Springfield; and The Waltham Baking Company, 2 cases, of Waltham, were convicted for violations of the baking laws and regulations.

The Goodrest Trading Corporation of Springfield; A. Simon and Sons, Incorporated, of Framingham; Kyriaco Boyatzi of Worcester; Charles J. Ehulich, Incorporated, of New Bedford, General Mattress Company of Fall River; Hartford Mattress Company, Incorporated, of Hartford, Connecticut; Lullaby Products Company, 2 cases, of Carnegie, Pennsylvania; and the Scharco Manufacturing Company, Incorporated, of New York, New York, were all convicted for violations of the mattress laws. The General Mattress Company of Fall River appealed their case.

Frank Astuti of Boston was convicted for the obstruction of a State Inspector. He appealed his case.

In accordance with Section 25, Chapter 111 of the General Laws, the following is the list of articles of adulterated food collected in original packages from manufacturers, wholesalers, or producers:

Clams which contained added water were obtained as follows: 6 samples, from I. W. Stavis of Chelsea; 2 samples from George R. Dow of Salisbury; and 1 sample each, from Carl Savage of Rowley, First National Stores of Boston, and Economy Grocery Stores, Incorporated, of Brockton.

Cream cheese which did not conform to the legal standard was obtained as follows:

5 samples from Conestoga Cream & Cheese Manufacturing Company of New York City, and 1 sample from East Smithfield Farms Company of Philadelphia, Pennsylvania.

Olive oil which contained cottonseed oil was obtained as follows:

Two samples each, from S. Mazzarelli & Sons, Incorporated, of Milford; Jack Gandolfo of Boston; and Dero-Teti of Ithaca, New York; and one sample from C. Pappas Wholesale Grocery Company of East Boston.

One sample of olive oil adulterated with peanut oil was obtained from Paul Cimini of Pittsfield.

Maple syrup which contained cane sugar was obtained as follows: 1 sample each, from Clover Dairy, Incorporated, and The Mayflower Shops of Boston; and Rhode Island Wholesale Provision Company of Providence, Rhode Island.

Two samples of prunes which were infested with worms and beetles were obtained from Rechter Trading Company of Boston.

One sample of cream which was low in fat for the grade specified was obtained from Tabbut's Dairy Farm of Woburn.

One sample of whole eggs which was decomposed was obtained from Rudnick & Meagher, Incorporated, of Worcester.

One sample of rolled oats which contained weevils was obtained from Lee's Bakery of Chelsea.

One sample of wash water which was deficient in caustic alkali was obtained from Dobbs Beverage Company of Leicester.

One sample of ground pork which was decomposed was obtained from Mohican Market of Salem.

Hamburg steak which was decomposed was obtained as follows: One sample each, from Brockelman Brothers Company, Incorporated, and United Public Markets, of Worcester; Terminal Market of Roxbury; Anthony J. Cafferty and P. Schwachman & Sons of Boston; Middlesex Cash Market of Lowell; and Robert Suher of Holyoke.

One sample of hamburg steak which was decomposed and contained a compound of sulphur dioxide not so labeled was obtained from Enrico Pasquale of Waltham.

One sample of hamburg steak which contained a compound of sulphur dioxide not so labeled was obtained from Alters Market of Roxbury.

Sausage which was decomposed was obtained as follows: One sample each, from Mattapan Super Market of Mattapan; Clinton Market, and Max Parker of Roxbury; Mohican Market of Quincy; Brockelman Brothers Company, Incorporated, of Worcester and Marlboro; N. M. Alpert, Blackstone Supply Company, and J. Goldberg of Boston; First National Stores of Orange; and John West of Athol; and 2 samples, from Stop and Shop (Economy Grocery Stores, Incorporated) of Roxbury.

Sausage which contained a compound of sulphur dioxide not so labeled was obtained as follows: One sample each, from Ralph Mancinelli of Marlborough; Max Davidson, Harry Brefick, Sam Mazoff, and West End Provision, Incorporated, of Boston.

Sausage which contained an excess of 2% cereal or vegetable flour was obtained as follows:

Four samples from State Sausage Company, Incorporated, of Boston; 3 samples from Omaha Packing Company of Lowell, and 2 samples from Omaha Packing Company of Boston; and 1 sample from United Sausage Company of Lynn.

Vinegar which was low in acid was obtained as follows: One sample each, from Economy Grocery Stores Corporation of Bedford; and Standard Pickle Company of New Britain, Connecticut.

There were 42 confiscations, as follows:—40 pounds of eggs, 120 pounds of poultry, 5 pounds of squabs, 893 pounds of turkeys, 668 pounds of meat, 3,270 pounds of beef, 230 pounds of pork, 480 pounds of lamb legs, 1,431 pounds of frankforts, 12 pounds of hamburg steak, 10 pounds of lamb patties, 226½ pounds of Italian sausages, 9 pounds of sausage meat, 5 pounds of sausage patties, 5 pounds of blood pudding, 35 pounds of haddock fillets, 3 pounds of swordfish, 10 pounds of lobster, ½ gallon of clams, 24 jars of pickled herring, 200 quarts of sour cream, 600 pounds of cottage cheese, 20 pounds of cake mix, 75 pounds of corn meal, 10 pounds of corn starch, 5 pounds of prunes, 15 pounds of white raisins, 25 pounds of rhubarb pie filling, 2 boxes of strawberries, and 25 pounds of sauerkraut. These confiscations were made because the food was decomposed and unfit for human consumption.

The licensed cold storage warehouses reported the following amounts of food placed in storage during March, 1941: 106,590 dozens of case eggs; 1,174,060 pounds of broken out eggs; 261,804 pounds of butter; 1,497,973 pounds of poultry; 2,667,044 pounds of fresh meat and fresh meat products; and 6,145,036 pounds of fresh food fish.

There was on hand April 1, 1941: 97,350 dozens of case eggs; 1,230,799 pounds of broken out eggs; 408,213 pounds of butter; 7,679,788 pounds of poultry; 12,721,972 pounds of fresh meat and fresh meat products; and 8,854,784 pounds of fresh food fish.

The licensed cold storage warehouses reported the following amounts of food placed in storage during April, 1941: 1,449,030 dozens of case eggs; 2,242,374 pounds of broken out eggs; 457,754 pounds of butter; 1,996,434 pounds of poultry; 4,163,336 pounds of fresh meat and fresh meat products; and 8,918,719 pounds of fresh food fish.

There was on hand May 1, 1941: 1,457,280 dozens of case eggs; 2,448,764 pounds of broken out eggs; 550,610 pounds of butter; 6,298,617 pounds of poultry; 13,317,241 pounds of fresh meat and fresh meat products; and 10,984,863 pounds of fresh food fish.

The licensed cold storage warehouses reported the following amounts of food placed in storage during May, 1941: 1,937,370 dozens of case eggs; 2,020,965 pounds of broken out eggs; 1,696,116 pounds of butter; 2,157,163 pounds of poultry; 3,603,346 pounds of fresh meat and fresh meat products; and 13,207,855 pounds of fresh food fish.

There was on hand June 1, 1941: 2,912,310 dozens of case eggs; 3,210,849 pounds of broken out eggs; 1,949,465 pounds of butter; 5,918,780 pounds of poultry; 11,880,811 pounds of fresh meat and fresh meat products; and 16,409,731 pounds of fresh food fish.

The licensed cold storage warehouses reported the following amounts of food placed in storage during June, 1941: 1,027,770 dozens of case eggs; 1,918,912 pounds of broken out eggs; 3,119,266 pounds of butter; 1,942,176 pounds of poultry; 4,463,352 pounds of fresh meat and fresh meat products; and 17,196,051 pounds of fresh food fish.

There was on hand July 1, 1941: 3,537,450 dozens of case eggs; 3,930,791 pounds of broken out eggs; 4,413,754 pounds of butter; 5,538,418 pounds of poultry; 10,757,846 pounds of fresh meat and fresh meat products; and 21,885,323 pounds of fresh food fish.

The licensed cold storage warehouses reported the following amounts of food placed in storage during July, 1941: 630,330 dozens of case eggs; 1,893,448 pounds of broken out eggs; 2,397,244 pounds of butter; 2,047,574 pounds of poultry; 3,297,473 pounds of fresh meat and fresh meat products; and 21,108,392 pounds of fresh food fish.

There was on hand August 1, 1941: 3,490,650 dozens of case eggs; 4,794,141 pounds of broken out eggs; 6,126,462 pounds of butter; 5,034,568 pounds of poultry; 8,533,305 pounds of fresh meat and fresh meat products; and 28,078,917 pounds of fresh food fish.

The licensed cold storage warehouses reported the following amounts of food placed in storage during August, 1941: 288,600 dozens of case eggs; 867,930 pounds of broken out eggs; 912,551 pounds of butter; 1,644,476 pounds of poultry; 3,515,996 pounds of fresh meat and fresh meat products; and 16,396,069 pounds of fresh food fish.

There was on hand September 1, 1941: 3,028,110 dozens of case eggs; 4,609,969 pounds of broken out eggs; 6,248,956 pounds of butter; 4,407,108 pounds of poultry; 6,602,963 pounds of fresh meat and fresh meat products; and 30,241,023 pounds of fresh food fish.

The licensed cold storage warehouses reported the following amounts of food placed in storage during September, 1941: 254,460 dozens of case eggs; 699,636 pounds of broken out eggs; 606,900 pounds of butter; 2,557,329 pounds of poultry; 3,730,340 pounds of fresh meat and fresh meat products; 13,523,687 pounds of fresh food fish.

There was on hand October 1, 1941: 2,674,350 dozens of case eggs; 4,020,918 pounds of broken out eggs; 6,184,702 pounds of butter; 5,338,058 pounds of poultry; 5,551,924 pounds of fresh meat and fresh meat products; and 30,391,329 pounds of fresh food fish.

MASSACHUSETTS DEPARTMENT OF PUBLIC HEALTH

Commissioner of Public Health, Paul J. Jakmauh, M.D.

Public Health Council

Paul J. Jakmauh, M.D., *Chairman*

R. Nelson Hatt, M.D.
Gordon Hutchins
Francis H. Lally, M.D.
Richard M. Smith, M.D.
Richard P. Strong, M.D.
James L. Tighe

Secretary, Florence L. Wall

Division of Administration	Under direction of Commissioner
Division of Sanitary Engineering	Director and Chief Engineer, Arthur D. Weston, C.E.
Division of Communicable Diseases	Director, Roy F. Feemster, M.D.
Division of Biologic Laboratories	Director and Pathologist, Elliott S. Robinson, M.D.
Division of Food and Drugs	Director and Analyst, Hermann C. Lythgoe, S.B.
Division of Child Hygiene	Director, M. Luise Diez, M.D.
Division of Tuberculosis	Director, Alton S. Pope, M.D.
Division of Adult Hygiene	Director, Herbert L. Lombard, M.D.
Division of Genitoinfectious Diseases	Director, Ernest B. Howard, M.D.

State District Health Officers

The Southeastern District	Harold W. Stevens, M.D., Middleborough
The South Metropolitan District	Henry M. De Wolfe, M.D., Braintree
The North Metropolitan District	Vlado A. Getting, M.D., Boston
The Northeastern District	Robert E. Archibald, M.D., Melrose
The Worcester District	Oscar A. Dudley, M.D., Worcester
South Connecticut Valley District	Charles E. Gill, M.D., Westfield
North Connecticut Valley District	Walter W. Lee, M.D., Greenfield
The Berkshire District	Morris Taylor, M.D., Pittsfield

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THE COMMONHEALTH

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1942

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DEPARTMENT ACTIVITIES

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MASSACHUSETTS DEPARTMENT OF PUBLIC HEALTH

Commissioner of Public Health, PAUL J. JAKMAUH, M.D.

Public Health Council

PAUL J. JAKMAUH, M.D., *Chairman*

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GORDON HUTCHINS
FRANCIS H. LALLY, M.D.
RICHARD M. SMITH, M.D.
RICHARD P. STRONG, M.D.
JAMES L. TIGHE, B.A.Sc., C.E.

FLORENCE L. WALL, *Secretary*

DIVISION OF ADMINISTRATION . .	Under direction of Commissioner
DIVISION OF TUBERCULOSIS . . .	*Director* and *Deputy Commissioner*, ALTON S. POPE, M.D.
DIVISION OF ADULT HYGIENE . . .	*Director*, HERBERT L. LOMBARD, M.D.
DIVISION OF BIOLOGIC LABORATORIES .	*Director*, ELLIOTT S. ROBINSON, M.D.
DIVISION OF CHILD HYGIENE . . .	*Director*, M. LUISE DIEZ, M.D.
DIVISION OF COMMUNICABLE DISEASES	*Director*, ROY F. FEEMSTER, M.D.
DIVISION OF FOOD AND DRUGS . .	*Director*, HERMANN C. LYTHGOE, S.B.
DIVISION OF GENITOINFECTIOUS DISEASES	*Director*, ERNEST B. HOWARD, M.D.
DIVISION OF SANITARY ENGINEERING .	*Director*, ARTHUR D. WESTON, C.E.

Assistant to the Commissioner, JOHN J. POUTAS, M.D.

State District Health Officers

NORTHEASTERN DISTRICT . . .	ROBERT E. ARCHIBALD, M.D.
NORTH METROPOLITAN DISTRICT . .	VLADO A. GETTING, M.D.
SOUTH METROPOLITAN DISTRICT . .	HENRY M. DEWOLFE, M.D.
SOUTHEASTERN DISTRICT . . .	HAROLD W. STEVENS, M.D.
WORCESTER DISTRICT	OSCAR A. DUDLEY, M.D.
NORTH CONNECTICUT VALLEY DISTRICT	WALTER W. LEE, M.D.
SOUTH CONNECTICUT VALLEY DISTRICT	CHARLES E. GILL, M.D.
BERKSHIRE DISTRICT	MORRIS TAYLOR, M.D.

Institutions and Superintendents

LAKEVILLE STATE SANATORIUM . .	LEON A. ALLEY, M.D.
NORTH READING STATE SANATORIUM .	CARL C. MACCORISON, M.D.
RUTLAND STATE SANATORIUM . .	ERNEST B. EMERSON, M.D.
WESTFIELD STATE SANATORIUM . .	ROY MORGAN, M.D.
PONDVILLE HOSPITAL	GEORGE L. PARKER, M.D.

ACTIVITIES

OF THE

DEPARTMENT OF PUBLIC HEALTH OF MASSACHUSETTS DURING 1941

THE PUBLIC HEALTH COUNCIL

At the end of the fiscal year closing November 30, 1941, the Department of Public Health was constituted as follows:

Commissioner of Public Health, Paul J. Jakmauh, M.D.

Public Health Council

R. Nelson Hatt, M.D., 1945
Gordon Hutchins, 1944
Francis H. Lally, M.D., 1942
Richard M. Smith, M.D., 1943
Richard P. Strong, M.D., 1946
James L. Tighe, B.A.Sc., C.E., 1947

Thirteen meetings of the Department were held during the year. Twelve public hearings were held as provided by statute relative to approval of the taking of certain lands for the protection of water supplies, approval of plans for sanitary sewers and sewage treatment works, the proposed use of land for cemetery purposes, an alleged nuisance caused by the keeping of swine, and appeals from actions of local milk inspectors in refusing to grant licenses to sell milk.

The Committee on Sanitary Engineering, composed of Mr. Tighe, Chairman, Mr. Hutchins, and the Commissioner, has met whenever necessary prior to the regular meetings of the Department and submitted recommendations on matters of sanitary significance.

In October, in order to re-establish the reputation for research work which the Lawrence Experiment Station held for many years, a cooperative arrangement between the Department and Harvard University for the employment of a Consultant for Research Work was approved.

The Council has performed its regular duties as imposed by law, including the promulgation of regulations allowing short-time, high-temperature pasteurization of milk and the revision of rules and regulations relative to diseases dangerous to the public health, the operation of plants for the purification of shellfish, the business of slaughtering, the treatment of persons exposed to rabies, and the use of blood or other tissues for purposes of transfusion. A renewal contract for the care of tuberculous patients from Hampden County at the Westfield or Rutland State Sanatorium was approved for a period of three years, and the contract with the Massachusetts General Hospital for the care of persons suffering from arthritis was renewed for one year. The approval of appointments of medical personnel in the Department and at State and county sanatoria, of subsidies to various cancer clinics, of dispensaries and laboratories before licensing, of out-of-State shellfish dealers who have been approved by their respective state shellfish authorities and the United States Public Health Service, and of contracts for the production of certified milk, constitutes other matters upon which the Council has acted.

At a meeting of the Department on January 13, 1942, the Commissioner of Public Health presented to the Council a summary of the activities of the Department for the year 1941, and after consideration it was voted that the outline, together with the foregoing brief summary of the activities of the Public Health Council, be approved and adopted.

THE COMMISSIONER OF PUBLIC HEALTH

To the Public Health Council:

Gentlemen: This summary shows briefly the public health activities of the Commonwealth as carried on under near-normal conditions of peace time. As at the end of the year it seems certain that we are entering upon a new era, the expansion of our activities as planned for the ensuing year must be subject to changes which will adapt them to the circumstances of a more militaristic period, and curtailment or deferment of certain of them will no doubt be necessary.

I. ADMINISTRATION

During the year I personally attended or was represented at regular meetings of the following boards:

Approving Authority, consisting of the Secretary of the Board of Registration in Medicine, the Commissioner of Education, and the Commissioner of Public Health, to consider standards for medical schools and graduates thereof, some of the meetings including inspection of the various medical schools in the Commonwealth; Rating Board, consisting of the Surgeon General of the Commonwealth, the Commissioner of Public Health, and the Commissioner of Public Safety, to consider the retirement of members of the State Police; State Planning Board, consisting of the Commissioners of Conservation, Public Health, and Public Works, and six appointive members; Reclamation Board, consisting of representatives of the State Departments of Public Health and Agriculture; Massachusetts School Lunch Advisory Committee; the Massachusetts Child Council, and similar groups.

In April I attended the Annual Conference of State and Provincial Health Authorities and the State and Territorial Health Authorities held in Washington, at which time I was appointed to the following committees of the State and Provincial Health Authorities of North America for 1942: Committee on Child Hygiene; Subcommittee on Mental Hygiene; Committee on Environmental Sanitation; Subcommittee on Records and Subcommittee on Uniform Railway Code; and Committee on Records and Reports. I also attended the Annual Meeting of the American Public Health Association, the Annual Meeting of the American Medical Association, a meeting of the Society for Public Health Administration, and a meeting called by the Surgeon General of the United States Public Health Service to consider the hazards of mercury poisoning in the fur industry.

National Defense. The United States Public Health Service has assigned a representative to the First Corps Area to act as liaison officer between the health departments and the armed forces in the correlation of health and defense activities. We have cooperated with this liaison officer to the fullest extent in the control of certain communicable diseases, examinations for tuberculosis and genitoinfectious diseases, food inspection, sanitation and other conditions relative to health which present new problems with sudden overcrowding of living conditions in industrial and defense areas. He has cooperated with the Department by visiting communities adjacent to cantonment areas and under the Facilities Act has made surveys with a view to determining local needs and rendering assistance in order to continue a high standard of health. He has worked closely with the Department and has submitted for our advice applications for additional hospital and nursing facilities throughout the State.

Sanitary surveys have been made by the Department in the vicinity of Camp Edwards, Fort Devens and Westover Field.

The Department has been active in the defense program, and the organization formerly designated for disaster relief has been revised so that in the event of any emergency, coordination of personnel, service and facilities is immediately available. In this regard we have been in frequent consultation with the State Public Safety Committee as well as representatives of the Civilian Defense Program. Chapter 719, signed by the Governor on October 30, 1941, creates a State Emergency Commission to provide for the safety of the Commonwealth in time of military emergency. His Excellency has appointed me as a member of this Commission. The Department is represented on the staff of the Adjutant General by the Director of the Division of Sanitary Engineering.

A great number of the major defense problems relate to public health, and the responsibility for the solution of these problems and the direction of normal activities to meet emergency situations naturally becomes the duty of the Department of Public Health. The Department is endeavoring to cooperate with all defense agencies including the Massachusetts Committee on Public Safety, the Committee on Civilian Defense, and more than 300 local community organizations. In view of a possible emergency in the State House or immediately adjacent thereto, when first aid would be promptly needed, I have arranged for sufficient space and facilities to be made available as first aid quarters, with sufficient professional personnel and material facilities of the Department available as need requires.

New Legislation—New Activities. The 1941 session of the General Court enacted legislation affecting the work of the Department of Public Health in several instances.

Under Chapter 601, amended by Chapter 697, a clerk or registrar cannot accept notice of intention of marriage until he has received from both parties to the intended marriage a certificate signed by a physician practicing in Massachusetts or by a physician on active service in the armed forces of the United States. If a physician making an examination under this law discovers evidence of an infectious disease he must inform both parties of the nature of the disease and of the possibilities of transmitting it in marriage or pregnancy. Such examination must include a blood test for syphilis performed by the Department laboratory or a laboratory approved by the Department. With but one month's experience upon which to base an opinion, from the great number of inquiries which have arisen there would appear to be some uncertainty in regard to the practicability of enforcing this law as written.

Chapter 661 of the Acts of 1941 authorizes the Department to license hospitals and sanatoria. An advisory committee will be appointed to aid the Department in formulating rules and regulations relative to this new activity.

Under authority of Chapter 506, the Department may admit to the Lakeville State Sanatorium, for physiotherapy and muscle training, a limited number of persons with spastic paralysis. Studies under this legislation will be conducted in connection with the crippled children's program.

Chapter 612 authorizes the Department, with the approval of the Commission on Administration and Finance, to prepare and distribute without and within the Commonwealth, antitoxins, serums, vaccines, etc., applicable to the prevention or cure of disease, for the use of the armed forces of the United States or in civilian defense work.

Chapters 306 and 334 provide for the furnishing of medical service at low cost to subscribers to charitable corporations formed under these acts. Under Chapter 334 certain agreements made by medical service corporations with medical organizations and physicians are subject to the approval of the Department of Public Health, but to date no applications relative to such approval have come to our attention.

Chapter 37 of the Resolves of 1941 directs the Department to make a study relative to the eradication and control of ragweed.

Chapter 388 gives the Department further authority to prevent the pollution and contamination of inland and tidal waters. Chapter 353 increases the mandatory powers of the Department relative to preventing pollution of the Charles River.

Certain legislation was passed relative to investigation and improvement of the Metropolitan water supply and sewerage needs. I have agreed to serve as the representative of this Department on the special commission authorized by Chapter 91 to investigate the use of the Quabbin Reservoir by additional municipalities and the financing of the furnishing of water to communities within and adjacent to the Metropolitan Water District. The Department is represented by the Director of the Division of Sanitary Engineering on the special commission to consider sewage disposal needs of the North and South Metropolitan Sewerage Districts, under Chapter 720 of the Acts of 1941, and on a special commission to investigate housing, under Chapter 71 of the Resolves of 1941. Another resolve, Chapter 93, provides for a special investigation relative to additional sewerage works for the South Metropolitan Sewerage System in Dorchester and Milton.

Approval of Laboratories. The work of evaluating the performance of laboratories with a view to approval, begun two years ago under authority of Chapter 344 of the Acts of 1939, has been continued. Thirty-four laboratories have received approval and over 60 other laboratories have been approved for certain tests, especially for testing blood from prospective blood donors and performing routine serologic tests for syphilis, and will receive certificates of approval after further evaluation of other tests. The Wassermann Laboratory continues to send specimens to laboratories already approved in order to insure the continuance of a satisfactory rating.

Milk. 1941 has shown a record increase in the number of communities which have passed regulations requiring the pasteurization or certification of milk. Eighteen communities were added, bringing the total to 80, which represents about 78 per cent of the population of the State. It is estimated that over 90 per cent of the milk sold in the Commonwealth is pasteurized or certified.

Camps. The Department continues to have jurisdiction over the sources of water supply and sewage disposal works at all recreational, overnight and trailer camps licensed by local boards of health. In 1941 the original act relative to this matter was amended, making it compulsory for this Department to notify the owner of the camp by registered mail, in addition to the local board of health, relative to its findings in matters of water supply and sewage disposal. During the past year over 600 overnight and recreational camps were examined by the Department staff.

Arthritis. There is an increasing demand on the part of the public for hospitalization and treatment facilities for the alleviation of suffering from this disease, and the inauguration of a general arthritis program similar to programs carried on for other chronic diseases seems desirable. Consideration has been given to the establishment of a central research bureau adjacent to or in connection with an outstanding hospital. With existing institutions transforming their available facilities with a view to the needs of industry and national defense, the question of a special hospital for cases of arthritis and other chronic diseases should be given further consideration for the twofold purpose of immediate alleviation of suffering based on present knowledge, and further research in order to ascertain the most satisfactory treatment.

The results of the study at the Massachusetts General Hospital to date indicate that cases of arthritis should be treated as are tuberculosis cases, that pain should be treated immediately in order to prevent loss of normal joint function, and that it is desirable to have a small unit in connection with a general hospital or a teaching hospital for the careful study and intensive treatment of arthritic patients in order to ascertain a more satisfactory treatment than present limited knowledge of the disease permits.

New England Health Institute. On April 2, 3 and 4 the Eleventh New England Health Institute was held in Boston. This Institute was planned and conducted by the Massachusetts Department of Public Health with the aid of the following collaborating agencies: the health departments of the other New England States, the United States Public Health Service, the Children's Bureau of the United States Department of Labor, the Massachusetts Central Health Council, the Massachusetts Public Health Association, and the New England Sewage Works, Water Works, and Tuberculosis associations. The Institute was a marked success, with 1865 registrants representing twenty-seven of the forty-eight states, Canada, the Philippines and China; 121 individuals of prominence in national, state and local health organizations contributed their time as speakers or chairmen of various sections.

Local Health Administration. The coordination and extension of state public health activities into a more unified district organization, based on experience in the Worcester District, was expanded to the North Connecticut Valley District early in 1941. The functions and activities of these two areas appear to be acceptable to the local boards of health and it is anticipated that early in 1942 the Westfield District may be so organized since in its physical set-up it already contains in a large measure sufficient facilities to make possible expansion with minimal expense. It is also proposed that early in 1942 the Pittsfield area be organized, with minor changes and additions to existing facilities to meet the needs of the district. The third contemplated district is that of southeastern Massachusetts. Here there is great need for additional office space and equipment in order to conform to the service given in the Worcester and North Connecticut Valley areas and meet the demands of the southeastern section of the State.

Public Health Nursing. The position of Chief Supervisor of Public Health Nursing was filled on September 15, 1941. As the year closes we are planning more effective coordination of the nursing activities of all Divisions by placing the nursing personnel administratively in the Division of Administration under the Chief Supervisor of Public Health Nursing as soon as suitable office space is prepared.

Social Service. The establishment in the Division of Administration of the position of Supervisor of Social Service is in keeping with the present day trend in public health administration. With the development of district health offices, a more generalized program in medical social service seems possible which would tend to more efficient service. The Supervisor of Social Service would be responsible to the directors of the various divisions of the Department in the formation and extension of their programs in the various districts. This change, however, must be accomplished gradually because of the long established routine of the social workers in the various Divisions.

Services for Crippled Children. On September 1, 1941 the Department completed five years of service to crippled children. During the five-year period 2,089 crippled children were admitted to service, of whom approximately 900 are still under active care, indicating the need of long-continued orthopedic treatment in a large proportion of cases. Regular monthly clinics are held at the ten clinics located in the following communities: Brockton, Fall River, Gardner, Haverhill, Hyannis, Lowell, Northampton, Pittsfield, Salem and Worcester. During the five-year period the average attendance was 16 children at each clinic session. In the past year the total clinic attendance has exceeded 2,000, including new patients sent by their physicians, and patients returning for further observation, adjustment of apparatus, and similar reasons. During 1941 approximately 230 children were admitted to hospitals for surgical treatment. Almost 4,000 physical therapy treatments were given and approximately 5,700 home visits were made to patients during the year.

The reporting of congenital deformities and other crippling conditions in infants resulted in 188 such reports, which is approximately the same as 1940, the first year in which reporting was required by law.

It is hoped that programs for the care of children suffering from acute rheumatic fever and from cerebral palsy can be inaugurated early next year.

II. Communicable Disease

There has been an increase in German measles and mumps, with a slight increase in the incidence of measles, scarlet fever, and whooping cough. Although our 1941 total reported cases of communicable disease may be the highest since 1936, diphtheria, typhoid fever and paratyphoid fever reached new low levels. The following data are submitted in reference to the principal communicable diseases:

Anterior Poliomyelitis. For three years we have enjoyed a very low incidence of this disease. This year there has been a slight increase which did not reach epidemic proportions.

Diphtheria. I can report a record low for this disease and were it not for an increase in one city which had an unusually large number of cases, the incidence in the State would have been under 100. Diphtheria immunization in its newer aspects has created considerable interest, particularly in relation to national defense.

Encephalitis, Infectious. No new cases or new types have been reported.

Meningitis, All Forms. There has been a decided increase in meningococcic meningitis. From the locations of the reports it would appear that the increase occurred in certain areas affected by concentration of the population. Previous to May 15, 1941, only meningococcic meningitis and Pfeiffer's bacillus meningitis were reportable, but on that date all forms were made reportable. Reports have been received of a number of cases of pneumococcal meningitis and a small number of cases due to staphylococcus, streptococcus, and Salmonella organisms.

Pneumonia. The incidence this year represents the lowest number of cases ever recorded in the State. Even with the usual expected increase because of the seasonal nature of the disease, a record low was reached in the State. The use of serum is apparently decreasing due to the introduction of chemotherapy. The apparent change in the clinical behavior and the appearance of pneumonia cases indicates that we must continue our studies on the use of therapeutic serum to guide us in the future development of our pneumonia program. With serum available for nine types of pneumonia the distribution and use of the material must be encouraged.

Scarlet Fever. The increase noted during the year marks a continuation of the gradual increase in this disease which, however, has not reached epidemic proportions in any area since 1932. Although the control program carried on in the State at present is limited, this increase is evidence that we must enlarge upon a prophylactic preventive program.

Smallpox. We are approaching the close a of ten year period in which no cases of this disease have occurred in Massachusetts.

Typhoid and Paratyphoid Fever. The number of sporadic cases of these two diseases has continued to decline. Twenty-one typhoid carriers were added to the typhoid carrier list; at the present time this list numbers 164, as compared to 159 last year.

Undulant Fever. Although this disease reached an unusually high level, indicating the need of complete pasteurization of milk and closer inspection of the process of pasteurization, intensified case-finding efforts, particularly in the central and western parts of the State, may account for a part of the high incidence.

Whooping Cough. Although this disease showed an increased incidence for the year as a whole, the increase occurred during the early part of the year, and the end of the year showed a tendency toward a lower level.

Other Diseases. No cases of psittacosis, Rocky Mountain spotted fever, or tularemia were reported during the year.

Division of Tuberculosis

The year 1941 showed an upward trend in tuberculosis morbidity and mortality. There were nearly 300 more cases reported than in the previous year. Since the ratio of adult male to female deaths from tuberculosis has been rising steadily, the question of whether this increase may not be due, in part at least, to increased employment and overtime by industrial workers should be given consideration.

During the school year 1940–41 new school tuberculosis clinics were held in 31 communities, in which 14,487 children were given the tuberculin test, 5,237 of whom were X-rayed. The incidence of tuberculosis found in this group was 3.2 per 1,000 X-rayed. Re-examination clinics were held in 31 communities, in which 1,252 children were X-rayed. The incidence of tuberculosis found in this group was 1.0 per 1,000 X-rayed.

In addition to the school clinics, our clinic staff X-rayed approximately 34,000 National Guardsmen and soldiers inducted into the Army during the year. With the exception of the purchase of the films, the entire work of X-raying, processing and interpreting was done by our clinic personnel, using regular portable X-ray machines.

Division of Genitoinfectious Diseases

The Department's program in regard to the control of gonorrhea and syphilis has indicated the lowest reported incidence of these two diseases. Toward the end of the year this program was largely directed toward the relation of syphilis and gonorrhea to national defense. While there was a decrease in the amount of arsenicals distributed during the year, the increased interest in the use of mapharsen indicates that this product will eventually displace the other arsenical drugs. Part of the decrease in the distribution of bismuth subsalicylate is also probably due to the increased use of mapharsen. During the past year the Department began the distribution of sulfathiazole to clinics for the treatment of gonorrhea.

The follow-up of 123 pregnant women reported to have syphilis, approximately half of whom have been delivered, indicates no congenital syphilis among their infants.

In a program for the control of prostitution and allied problems, the Department has cooperated with the Social Protection Division of the Massachusetts Committee on Public Safety, the United States Public Health Service, the Division of Social

Protection of the Federal Security Agency, the Boston Licensing Board, the Massachusetts Society for Social Hygiene, various police chiefs, and the Army and Navy. We have found no indication of the need of drastic measures to control prostitution nor to date has it been considered necessary to invoke the authority granted under Federal legislation on this matter.

All selectees have been examined for syphilis serologically by draft board physicians and the results of the analyses of these tests over the country indicate that Massachusetts had the second lowest positive syphilis rate in the country. All selectees, soldiers and sailors reported in Massachusetts with positive syphilis have been interviewed by the Department or clinic nurses.

Laboratories

Antitoxin and Vaccine Laboratory. The routine production and distribution of biologic products has been maintained at the usual rate although in the later months of the year special attention was directed toward products needed for national defense. The preparation of serum albumin for use as a substitute for blood in transfusion is being studied.

Wassermann Laboratory. The total number of all tests performed has showed an increase of 20 per cent, and of tests for syphilis of over 25 per cent, such increases being largely attributable to the serologic tests for syphilis done for the National Guard and the selective service boards. The duties imposed on the Department by Chapter 601 of the Acts of 1941, which requires a blood test on all persons applying for marriage licenses in Massachusetts, will result in the submission of a great many more specimens to this laboratory by physicians and institutions.

Bacteriological Laboratory. During the year this laboratory made over 75,000 examinations on specimens submitted, principally for diphtheria, gonorrhea, malaria, pneumonia, tuberculosis, typhoid fever and undulant fever. While this was less than the number examined in 1940, the decrease is probably due to the smaller number of specimens submitted for examination for diphtheria and for the enteric diseases.

III. HYGIENE

Division of Child Hygiene

Upon request, prenatal clinics were visited and assisted by the child welfare physicians, dentists, nursing supervisors and nutritionists of this Division: obstetrical packages for use in home deliveries were demonstrated by the nursing supervisors: instruction in maternal and child care was given at mothers, classes: the study of the deaths of premature infants was continued and plans made for expanding the study; 23 nursery supervisors took the refresher course offered for the care of premature infants; well child conferences were held at which over 3,000 children were examined. A school hygiene survey was made and recommendations based on the findings sent to the local school authorities.

In cooperation with the State Department of Public Welfare an institute for public health nurses was held, assistance was given to local communities, and new local nursing services and public health activities were stimulated.

Many requests have been received for our nutritionists to serve on various committees and participate in educational nutritional programs. Lectures on dental health were given to teachers and school officials, and students at medical, dental and nursing schools. Much interest has been shown in the Department's work along the lines of parent education.

"The Massachusetts Vision Test" as approved by members of the State Departments of Education and Public Health is available to schools upon request. The Department has cooperated with school superintendents in regard to the development of methods and techniques for testing hearing.

The special project planned last year involving a study of pregnant diabetic women is being continued.

The health education activities of the Department were expanded by exhibits and lectures to health councils and community health organizations. Under the sponsorship of the State Departments of Education and Public Health, the Massachusetts School Superintendents' Association and the Massachusetts School Principals' Association, the Joint Committee on Health Education is engaged in a special study of the health needs of high school pupils.

Division of Adult Hygiene

The year 1941 marked the completion of the fifteenth year of the cancer program of the Department. During this period the average delay between first recognized symptom of the disease and the first visit to a physician has decreased from 6.5 months to 4.6 months. In the early years of the program it was found that only 15 per cent of the cancer patients visited their physician within a month after noting their symptoms, whereas now we find that this number has risen to 21 per cent. Another result of our program has been the increased interest and change in attitude toward cancer on the part of both the laity and the medical profession, as evidenced by increased attendance at cancer clinics, the extension of educational programs, and the organization of cancer control committees in additional communities. The Division has carried on extensive research activities and epidemiological surveys. The number of specimens submitted for pathological examination reached over 4,000, which is a record high. Much interest has been shown in our program by representatives of other states and countries, indicating that Massachusetts is acting as a leader in constructive procedures in the control of cancer.

IV. ENVIRONMENTAL CONTROL

Division of Sanitary Engineering

The number of applications received by the Department for advice on sanitation and related matters was slightly higher than in 1940. The compliance with many of these requests necessitated field examinations by representatives of the Water and Sewage Laboratories and the Lawrence Experiment Station as well as the engineering staff of this Division.

Rainfall. The rainfall recorded over the State for the year was about 18 per cent less than normal, with a deficiency in every month except June and July. This rainfall deficiency has resulted in serious shortages in drinking water supplies, water supplies for industrial purposes, and extremely low stages of streams. At the same time the records of water consumption in the Metropolitan Water District have showed a progressive increase, particularly in the communities where important defense industries are located. Because of the drought the following streams have shown the effect of the pollutional load discharged into them and the Department has advised communities and industries concerning the matter: the Aberjona, Assabet, Blackstone, Charles, Hoosick, Housatonic, Merrimack, Millers, Quinebaug, Seven Mile, Squannacock, and Ten Mile rivers.

Sewage Disposal. New sewage treatment works were put into operation during the year in East Longmeadow, Ludlow, Chicopee (Westover Field), Fort Devens and Camp Edwards. The Department has recommended particularly changes in the Nut Island sewage treatment plant as a part of the program for improving Boston Harbor, the construction of works at Hull for the removal of present objectionable conditions, the installation of suitable devices for improving sewerage conditions at Gloucester, and additional sewage treatment works to serve the town of Ayer, particularly a new United States Defense Housing Project in connection with Fort Devens. In addition, the Works Projects Administration has been advised relative to 145 sewerage projects. The following communities have been advised relative to certain sewerage needs: Danvers, Hingham, Swampscott, Quincy, Holden, Fitchburg, North Brookfield, Gloucester, Warren, Northbridge and Natick.

Shellfish. During the year the areas from which the taking of shellfish for food is prohibited in Barnstable Harbor, Boston Harbor and Gloucester Harbor were redefined, Scituate Harbor was closed, Manchester and Oak Bluffs harbors were closed temporarily during the summer season, and an additional area at Coles River, Swansea, was opened. Certain areas in Boston and Gloucester harbors and the Ispwich River were approved for the taking of shellfish for purification purposes.

Cross Connections. The inspection of cross connections between public water supplies and industrial or other secondary water supplies has been continued. During the past year 852 plants were inspected, at which 637 cross connections were found. However, at 484 of these plants the public water supply was found to be adequately protected by approved double check valves, and at 38 the water supply was partially protected. The owners of the other 115 plants were given instructions as to adequate protection of the water supply.

Water and Sewage Laboratories

In addition to the routine chemical, microscopical and mineral examinations made in these laboratories in connection with the oversight of water supplies, sewage disposal works and the pollution of streams, the following studies were conducted: Experiments to determine the saturation index and the required dosage of chemicals for corrosive correction treatment of certain municipal water supplies; experiments on the lime treatment of a scum found floating on the surface of the Imhoff tank at the Natick sewage disposal plant; analyses of samples of scum discharged from industrial plants at Woburn and of similar material found floating on the Aberjona River, Winchester; experiments on the possible effects of the use of chlorinated settled sewage at Weston College for irrigation on grasses and plants; examination of two samples of industrial wastes, one of which was suspected of containing benzene and the other of containing gelatin; testing of a gas-mask canister for its chlorine absorption capacity; testing of a vacuum breaker device sold for installation on flush closets to determine its corrosiveness both in fresh and salt waters; investigation of so-called "black water" appearing in the public water supply of Groton; the use of various solvents and techniques for the determination of fats in sewage; a comparison between the colorimetric and electrometric methods for hardness determination in water; and examinations on samples of water from Boston Harbor to determine the presence of organisms that might be used as an index of pollution.

Lawrence Experiment Station

The regular bacterial examinations of water and shellfish, chemical analyses of industrial wastes, and sand analyses were continued at this laboratory. Differentiation studies on coliform bacteria from Merrimack River water stored for thirty days and subsequently filtered through sand were continued; four high rate trickling filters have been operated· three identical septic tanks with varying detention periods have been operated in order to study over a period of time the destruction of sludge and the clarification of sewage; in connection with the shortage of alum, successful studies were made both in the laboratory and in the field in regard to the substitution of iron salts for alum in the treatment of trade wastes; further study was made of starch wastes which were found responsible for the high bacterial content of the Charles River; the examination of samples of grease balls from the North Shore indicated that mineral oil discharged into sewers was at least partially responsible for such formations.

Division of Food and Drugs

The year has shown an increase in the number of pasteurization plants throughout the State, particularly in the smaller communities. The inspectors of this Division have checked constantly on the methods and results of the pasteurization and have attained a great improvement in many of the plants. High temperature, short time pasteurization of milk is again allowed in Massachusetts, this action of the Department being taken under authority of Section 48A of Chapter 94 of the General Laws after consideration of studies conducted in New York and Connecticut. To date only three pieces of apparatus for pasteurization by this method have been installed in Massachusetts and frequent investigations will be made in order to improve the somewhat unsatisfactory conditions found on first inspection.

The members of the Food and Drug Division have worked closely with the Federal inspectors in allied lines. It is regretted that the changes which the Department suggested in the Massachusetts food and drug law in order to conform more closely with the Federal law were not passed by this year's Legislature. Massachusetts manufacturers doing interstate business must comply with the Federal law. Because of this they meet unfair competition from other Massachusetts manufacturers who are not engaged in interstate business and who can therefore operate under a less strict and rigid law.

In addition to the routine inspectional and investigational work regarding bakeries, soft drink and ice cream plants, cold storage warehouses, slaughtering, etc., the production and sale of sausages and olive oil have required constant supervision by our inspectors and chemists. In the case of sausages, decomposed meat and an illegal amount of soy bean meal have been detected in many instances, in most of which convictions were obtained in court and penalties imposed. Due to the difficulty of obtaining pure olive oil from Europe, the adulteration and misbranding of this product are increasing.

V. Regulations

Rules and regulations have been promulgated by the Department of Public Health relative to:

Diseases dangerous to the public health
Approved Aug. 9, 1938
Revised Oct. 11, 1938
Revised Feb. 14, 1939
Revised May 13, 1941

Conveyance of bodies dead of any disease dangerous to the public health
Approved Aug. 9, 1938
Revised Feb. 14, 1939

Funerals of persons dead of any disease dangerous to the public health
Approved Aug. 9, 1938

Treatment of persons exposed to rabies
Approved Aug. 10, 1937
Amended May 13, 1941

Sale of rabbits intended for food purposes
Approved May 14, 1929

Dispensary license
Approved May 10, 1938

Approval of bacteriological and serological laboratories
Approved Sept. 12, 1939

Distribution of biologic products
Approved Apr. 9, 1935
Amended May 14, 1940

Use of blood or other tissues for purposes of transfusion
Approved Mar. 14, 1939
Amended Oct. 7, 1941
Amended Nov. 4, 1941

Payment for certain laboratory tests on specimens from cases of pneumonia
Approved Nov. 15, 1938

Use of a common drinking cup
Amended Mar. 22, 1916

Providing of a common towel

Amended Mar. 22, 1916

Use of the common drinking cup and common towel in factories, workshops, manufacturing, mechanical and mercantile establishments

Jails, houses of correction, prisons and reformatories

Approved July 6, 1905

Lodging houses

Approved July 6, 1905

Cremation

Adopted Dec. 5, 1907
Amended Oct. 29, 1918

Cancer clinics

Approved Jan. 15, 1935

Approved prophylatic remedy for use in the eyes of infants at birth

Approved May 12, 1936

Control of gonorrhea and syphilis

Approved Aug. 9, 1938
Revised Aug. 8, 1939
Revised Nov. 6, 1940

Provision of treatment for persons suffering from gonorrhea and syphilis who are unable to pay for private medical care

Approved Aug. 10, 1937

Tuberculosis hospitals

Approved May 10, 1938

Tuberculosis dispensaries

Approved May 10, 1938

Manufacture and bottling of carbonated nonalcoholic beverages, soda water, mineral and spring water

Approved Apr. 7, 1936

Approval of contracts for the production and distribution of certified milk

Approved Oct. 14, 1936

Establishments for the pasteurization of milk

Approved Feb. 12, 1935
Amended July 8, 1941

Short-time high temperature pasteurization of milk

Approved July 8, 1941
Amended Nov. 4, 1941

Purity and quality of food

Approved Feb. 9, 1937

Bakeries and bakery products

Approved Feb. 14, 1933

Frozen desserts and ice cream mix

Approved Sept. 11, 1934

Hams, pork butts and sausage containing pork products intended to be eaten without cooking

Approved Feb. 12, 1924

Business of cold storage

Approved Oct. 10, 1933

Sale of cold storage eggs

Approved July 11, 1922

Business of slaughtering and meat inspection

Approved Dec. 10, 1935
Amended Dec. 10, 1940

Tag to be attached to each article of bedding and each article of upholstered furniture

Approved Nov. 12, 1935

Sterilization of feathers, down and secondhand material intended for use in the manufacture of articles of bedding and upholstered furniture

Approved Nov. 12, 1935

Operation of plants for the purification of shellfish

Approved Apr. 7, 1936
Amended Oct. 10, 1938
Amended Oct. 7, 1941

Cross connections between public water supplies and fire and industrial water supplies

Approved Feb. 9, 1937

Protection of the drainage areas and sources of water supply in cities and towns and fire and water districts and water companies

Amended Apr. 8, 1941

IX. FINANCIAL STATEMENT

Federal Grants from the United States Public Health Service and Children's Bureau

The allotments for public health work for the Federal fiscal year July 1, 1941 to June 30, 1942 are as follows:

FEDERAL SECURITY AGENCY, UNITED STATES PUBLIC HELATH SERVICE		
Division of Administration	$ 12,192.16	
Division of Adult Hygiene	37,355.00	
Antitoxin and Vaccine Laboratory	17,640.00	
Division of Communicable Diseases	27,560.00	
Division of Food and Drugs	14,105.00	
City of Boston Health Education Project — Subsidy	4,460.00	
Division of Occupational Hygiene	21,195.00	
Pneumonia Control Project	10,000.00	
Division of Sanitary Engineering	66,391.00	
Division of Tuberculosis	27,836.33	
Training Personnel	2,600.00	
Vitamin Assay Work	7,340.00	
Division of Administration (Local Health Units)	12,430.00	
Barnstable County	2,280.00	
Berkshire District	4,505.00	
Nashoba Associated Boards of Health	11,784.00	
North Connecticut Valley District	9,780.00	
South Connecticut Valley District	3,100.00	
Southeastern District	2,070.00	
Worcester Health District	12,502.50	
TOTAL — PUBLIC HEALTH SERVICE		$307,125.99
FEDERAL SECURITY AGENCY, VENEREAL DISEASE CONTROL		
Training Personnel	$ 4,335.00	
Division of Genitoinfectious Diseases	120,890.70	
Wassermann Laboratory	35,340.00	
Instruction in Control of Gonorrhea and Syphilis — Subsidy to Harvard School of Public Health	9,220.00	
City of Boston Venereal Disease Control — Subsidy	21,800.00	
Postgraduate Courses in Venereal Disease	8,050.00	
TOTAL — VENEREAL DISEASE CONTROL		199,635.70
DEPARTMENT OF LABOR, CHILDREN'S BUREAU		
Crippled Children's Services A Account	$ 82,506.15	
Crippled Children's Services B Account	48,266.91	
TOTAL — CRIPPLED CHILDREN'S SERVICES		130,773.06
Maternal and Child Health Services A Account	$ 128,430.47	
Maternal and Child Health Services B Account	12,255.00	
TOTAL — MATERNAL AND CHILD HEALTH SERVICES		140,685.47
GRAND TOTAL — FEDERAL FUNDS		$778,220.22*

* Includes balances of previous year.

DEPARTMENT OF PUBLIC HEALTH

Appropriations and Expenditures for Year Ended November 30, 1941

	Appropriation and Amounts Brought Forward	Expenditures to Nov. 30, 1941
Division of Administration	$ 38,062.26	$ 37,366.67
Division of Adult Hygiene	90,800.00	82,630.22
Division of Child Hygiene	83,113.01	80,430.49
Division of Communicable Diseases	92,460.90	88,226.32
Division of Genitoinfectious Diseases	313,303.05	249,934.16
Division of Food and Drugs	76,017.43	71,527.51
Division of Biologic Laboratories:		
Antitoxin and Vaccine	116,274.28	110,644.66
Wassermann Laboratory	26,382.50	24,413.41
Administration of Shellfish Law	2,918.51	2,279.22
Division of Water Supply and Sewage Disposal	156,586.46	146,877.02
Division of Tuberculosis	46,460.64	45,827.89
Subsidies to Cities and Towns	494,745.54	494,739.77
Tuberculosis Clinic Units	50,057.42	47,237.24
Chronic Rheumatism	36,827.75	35,960.94
Sanitary Condition of Certain Rivers	352.52	288.40
	$1,624,362.27	$1,518,383.92

Receipts for Year Ended November 30, 1941

Licenses, etc.	$8,975.71

Financial Statement Verified (Second)
WALTER S. MORGAN, *Comptroller.*

State Sanatoria and Pondville Hospital

	Appropriations and Balances	Expenditures	Receipts
Lakeville State Sanatorium	$336,455.32	$332,816.59	$121,021.39
North Reading State Sanatorium	275,930.27	268,272.91	69,363.75
Rutland State Sanatorium	365,653.34	359,236.56	74,570.73
Westfield State Sanatorium	440,366.89	437,261.79	121,317.51
Pondville Hospital	361,695.85	354,673.74	67,605.40

Special Appropriations

	Appropriations and Balances	Expenditures
LAKEVILLE		
Chapter 419, 1941, Item 2022–21		
Fire Protection and Sprinklers	$5,540.00	——
Chapter 730, 1941, Item 2022–22		
Water Supply	1,725.00	——
Chapter 419, 1941, Item 2022–23		
Physiotherapy Unit at Children's West Ward	9,000.00	$ 5,290.23
NORTH READING		
Chapter 419, 1941, Item 2023–22		
Fire Protection and Sprinklers	2,200.00	——
Chapter 419, 1941, Item 2023–23		
Fire Protection Equipment	1,375.00	——
Chapter 419, 1941, Item 2023–24		
Improvements to Water Supply	4,100.00	——
RUTLAND		
Chapter 419, 1941, Item 2024–21		
Sewerage and Sewage Disposal	3,200.00	——
Chapter 419, 1941, Item 2024–22		
Fire Protection	2,700 00	——
WESTFIELD		
Chapter 419, 1941, Item 2025–21		
Fire Protection Equipment	2,000.00	——
P.W.A. Docket 1155 — Mass. State Project H-102		
Cancer and Tuberculosis Group	404.13	404.13
PONDVILLE		
Chapter 419, 1941, Item 2031–21		
Water Supply — Replacing Pipe Fixtures	700.00	——
Chapter 419, 1941, Item 2031–22		
Roads — Rebuilding and Resurfacing	3,000.00	2,475.80
Chapter 419, 1941, Item 2031–23		
Sprinkler System	1,200.00	——
Chapter 419, 1941, Item 2031–24		
Fire Fighting Equipment	2,650.00	——
Chapter 683, 1941, Item 2031–25		
Power Plant Improvements	100,000.00	——

Respectfully submitted,
PAUL J. JAKMAUH,
Commissioner of Public Health.

Approved and signed
R. NELSON HATT
GORDON HUTCHINS
FRANCIS H. LALLY
RICHARD M. SMITH
RICHARD P. STRONG
JAMES L. TIGHE
Public Health Council

THE DIVISION OF ADULT HYGIENE

HERBERT L. LOMBARD, M.D., *Director*

A cancer control program must have three objectives: first, prevention of cancer; second, early recognition and treatment of the disease; and third, studies to learn more about the disease. To attain these objectives, diagnostic cancer clinics, treatment centers, research, and education are necessities. Education should incite the individual to action. Diagnostic facilities must be available to him, and treatment centers if he is found to have the disease. Research may cover studies both of the causative factors of the disease and evaluations of the methods used in a cancer control program. Every activity should be subjected to appraisal to determine the worthwhileness of its continuation. The Massachusetts Cancer Program attempts to integrate cancer control by following these general procedures.

A continuation of the shorter period of delay between first recognizable symptoms and visit to physician first noted in 1936; a far greater use of the Tumor Diagnosis Service; more clinic admissions than ever before; thirty-nine teaching clinics attended by 898 physicians; a continuation in the decline of the adjusted cancer death rate among females; and an extension of the Cooperative Cancer Control Committees — were the principal measures of achievement of the Division of Adult Hygiene for 1941.

TABLE I. — *Outstanding Accomplishments*

	Average 1927–35	Average 1936–40	1941
Number of State-aided cancer clinics	12	21	23
Number of specimens diagnosed by Tumor Diagnosis Service	2,813	3,349	4,669
Number of doctors using Tumor Diagnosis Service . .	421	700	889
Number of hospitals using Tumor Diagnosis Service . .	97	115	118
Number of cancer patients attending cancer clinics . .	759	1,616	1,712
Percentage of cancer patients receiving treatment within one month of first symptoms	3.1	3.8*	6.9**
Percentage of cancer patients receiving treatment within four months of first symptoms	20.3	27.2*	32.9**
Median delay, in months, of cancer patients between first symptoms and visit to physician	6.5	5.2	4.0
Percentage of cancer patients going to physician within one month of first symptoms	15.0	19.1	23.5
Percentage of cancer patients attending cancer clinics referred by physicians	61.1	85.0	84.3
Female age adjusted cancer death rate per 100,000 population	125.2	120.6	118.3

* four-year average.
** 1940.

TABLE II. — *Massachusetts State-Aided Cancer Clinics, 1941*

CLINIC	Attendance New Patients*	Attendance Old Patients	Total Attendance	Attendance New Cancer Patients	Percentage Cancer Among New Patients	Number of Teaching Clinics	Attendance of Physicians at Teaching Clinics	Social Service Contacts	Percentage of Recommended Procedures Carried Out	Percentage Diagnostic X-rays	Percentage Biopsies
Beth Israel . .	161	1,454	1,615	80	49.7	0	0	132	93	75	34
Beverly . . .	69	281	350	18	26.1	0	0	788	83	43	12
Boston Dispensary	429	2,038	2,467	132	30.7	1	103	1,666	98	30	34
Brockton . .	137	125	262	64	46.7	3	68	1,031	81	9	31
Fall River . .	142	544	686	54	38.0	4	143	485	77	6	4
Fitchburg . .	44	196	240	15	34.1	4	26	746	84	23	23
Gardner . . .	50	76	126	17	34.0	5	71	422	74	40	0
Gloucester . .	33	63	96	12	36.3	3	41	285	71	42	0
Greenfield . .	11	40	51	5	45.4	1	15	72	71	0	0
Hyannis . . .	24	80	104	13	54.2	2	29	261	84	0	8
Lawrence . .	129	90	219	57	44.1	5	91	1,217	89	34	51
Lowell . . .	156	189	345	41	26.3	0	0	1,017	76	24	15
Lynn . . .	249	828	1,077	111	44.2	0	0	2,752	86	14	39
New Bedford . .	166	357	523	69	41.6	0	0	1,685	66	25	10
Newburyport .	25	51	76	6	24.0	4	33	217	68	8	0
North Adams .	7	33	40	4	57.2	0	0	181	72	0	0
Pittsfield . .	10	39	49	2	20.0	0	0	157	91	0	0
Pondville . .	1,503	7,650	9,153	515	34.2	0	0	–	–	–	–
Quincy . . .	17	54	71	3	17.7	0	0	179	77	24	24
Salem . . .	139	460	599	50	36.0	4	154	1,154	77	14	32
Springfield . .	90	192	282	19	21.1	0	0	1,583	73	11	42
Westfield . .	1,229	5,305	6,534	428	34.8	2	87	–	–	–	–
Worcester . .	297	856	1,153	67	22.5	1	37	2,148	77	15	8
Total . .	5,117	21,001	26,118	1,782	34.8	39	898				

* Some individuals went to more than one clinic.

TABLE III. — *Massachusetts Cancer Deaths*

Year	Average Age, in Years, of Cancer Deaths	Male Age Adjusted Cancer Death Rate per 100,000*	Female Age Adjusted Cancer Death Rate per 100,000*
1927	62.1	101.2	127.0
1928	62.3	104.1	126.6
1929	62.4	102.7	125.9
1930	62.6	105.7	123.3
1931	62.8	103.0	124.1
1932	62.9	105.8	127.0
1933	63.1	111.2	124.9
1934	63.0	117.6	126.1
1935	63.4	108.5	122.3
1936	63.8	115.0	120.6
1937	64.1	112.4	119.9
1938	63.9	116.9	119.9
1939	64.2	114.0	119.1
1940	64.2	115.3	123.6
1941	64.4	119.3	118.3

*Adjusted to total United States Census Population for 1930.

TABLE IV. — *Median Durations of Delay of Cancer Patients*

Massachusetts State-Aided Cancer Clinics

Year	Median Delay, in Months, between First Symptoms and Visit to Physician	Median Delay, in Months, between First Symptoms and Visit to Clinic
1931	6.7	12.2
1932	6.2	9.3
1933	6.1	9.4
1934	6.2	9.0
1935	6.2	9.3
1936	5.3	8.3
1937	5.7	8.7
1938	5.0	8.0
1939	5.0	8.1
1940	4.6	6.9
1941	4.0	7.0

TABLE V.— *Patients with Cancer Attending State-Aided Cancer Clinics from 1927 to June 30, 1931, Alive 10 Years After Cancer Diagnosis at Clinic, By Location of Cancer*

LOCATION OF CANCER	Alive	Dead	Total Population	PERCENTAGE ALIVE		
				Total	Under Age 50 at Clinic Admission	Over Age 50 at Clinic Admission
Buccal cavity	118	297	415	28.4	52.0	25.0
Digestive tract Respiratory system Male genitourinary organs	20	257	277	7.2	12.5	5.9
Female genital organs	50	232	282	17.7	22.4	14.5
Breast	66	314	380	17.4	21.6	15.0
Skin	360	374	734	49.0	87.0	44.2
Other and unspecified organs	43	83	126	34.1	39.3	32.2
Total	657	1557	2214			

TABLE VI.—*Percentage of Patients with Cancer Attending State-Aided Cancer Clinics Alive at Yearly Intervals Following Cancer Diagnosis at Clinics*

	Total	Skin*	Others*
Alive 1 year after	65.1	91.2	53.8
Alive 2 years after	51.7	83.2	37.6
Alive 3 years after	44.8	76.1	30.7
Alive 4 years after	40.3	69.9	27.0
Alive 5 years after	36.5	64.5	24.1
Alive 6 years after	33.2	59.9	21.5
Alive 7 years after	30.4	54.7	20.1
Alive 8 years after	27.7	49.5	18.5
Alive 9 years after	26.4	46.8	17.9
Alive 10 years after	24.5	42.9	16.7
Alive 11 years after	21.9	37.5	15.2
Alive 12 years after	19.9	33.8	14.1
Alive 13 years after	18.1	30.7	13.9
Alive 14 years after	13.2	23.3	10.1
Lost or unknown	2.6	5.5	1.9

*Individuals with multiple cancers have been omitted from this tabulation.

TABLE VII.—*Reason for Coming to Clinic, by Diagnosis*

Rate per 100*

REASON	CANCER		PRECANCEROUS LESIONS		ALL OTHERS		TOTAL	
	1940	1941	1940	1941	1940	1941	1940	1941
Physician	86.4	84.3	60.3	60.3	79.9	81.5	80.8	81.4
Past experience or former patient	10.5	10.3	30.0	32.3	8.6	8.0	10.6	10.0
Newspaper	0.6	0.7	1.9	1.6	2.2	1.1	1.6	1.0
Friend or relative	1.2	2.2	3.3	2.7	3.8	3.3	2.9	2.9
Social worker or nurse	1.8	1.7	4.7	1.6	3.5	2.6	3.0	2.2
All others	0.6	2.1	1.1	1.9	2.5	3.9	1.8	3.2

*Does not total 100 per cent, as some individuals gave more than one reason.

TABLE VIII.—*Attendance at State-Aided Cancer Clinics, 1941*

Total individuals attending clinics	4,971
Total individuals having cancer	1,712
Total individuals having precancerous lesions	257
Total individuals having postoperative cancer, no evidence of recurrence	175
Total attendance at clinics	5,117
Total cancer attendance at clinics	1,782
Total precancer attendance at clinics	228
Total postoperative cancer, no evidence of recurrence, attendance at clinics	187
Total diagnoses	5,120
Total cancer diagnoses	1,784
Total precancer diagnoses	257
Total postoperative cancer, no evidence of recurrence, diagnoses	182
Percentage of individuals with cancer	34.4
Percentage of individuals with precancerous lesions	5.2
Median age of total clinic patients	55.7
Median age of cancer patients	63.4

THE DIVISION OF BIOLOGIC LABORATORIES

Elliott S. Robinson, M.D., Ph.D., *Director*

I. Antitoxin and Vaccine Laboratory

1. *General*

The routine production and distribution of biologic products has been maintained at much the usual rate, with no changes in the list. The possibility of war has directed attention towards products needed for national defense, and legislation has been passed to permit the laboratory to prepare and distribute nonsurplus products for military and civilian defense needs.

Licenses were granted by The Federal Security Agency for the manufacture and distribution of immune globulins (placental extract) and of normal serum albumin (human).

2. *Distribution of Products*

Diphtheria	*1937*	*1938*	*1939*	*1940*	*1941*
Antitoxin, 1,000 unit doses	63,769	56,503	49,538	48,744	44,989
Schick Outfits, 50 doses each	4,905	4,033	3,928	4,136	3,842
Toxin-Antitoxin Mixture, 1 cc. doses	61,530	43,531	43,751	48,945	44,682
Toxoid, 1 cc. doses	274,759	283,139	262,170	251,704	248,003
Toxin (Bulk), cc.	580	1,070	1,885	1,780	1,715
Scarlet Fever					
S.F. Streptococcus Antitoxin, doses	1,893	1,737	1,823	1,405	1,849
S.F. Streptococcus Toxin, 5 cc. vials	636	554	610	391	195
S.F. Streptoccocus Toxin, Heated Control, 5 cc. vials	447	386	495	395	186
S.F. Streptoccocus Toxoid, 1 cc. doses	25,361	16,121	16,827	11,299	3,618
Pneumonia					
Antipneumococcic Serum, horse, conc. vials	5,800	6,707	6,651	4,037	2,579
Antipneumococcic Serum, horse, (Bulk) c.c.	200	4,427	700	11,550	1,450
Antipneumococcic Serum, rabbit, vials	...	...	193	1,266	1,199*
Diagnostic Serums (of rabbit origin, unless otherwise noted):					
Pneumococcus Type 1 — horse, cc.	235	105	105	15	7
Pneumococcus Type 2 — horse, cc.	245	80	70	10	–
Pneumococcus Type 3 — horse, cc.	230	55	55	15	7
Pneumococcus Type 1, cc.	300	335	237	171	103
Pneumococcus Type 2, cc.	288	271	218	154	92
Pneumococcus Type 3, cc.	276	292	231	162	108
Pneumococcus Type 4, cc.	...	...	35	108	53
Pneumococcus Type 5, cc.	170	264	166	134	91
Pneumococcus Type 7, cc.	134	260	168	142	91
Pneumococcus Type 8, cc.	162	281	190	143	130
Pneumococcus Type 14, cc.	...	...	106	138	53
Pneumococcus, other types	...	...	453	791	796**
Pneumococcus, Pool A, cc.	...	...	256	291	175
Pneumococcus, Pool B, cc.	...	...	260	295	178
Pneumococcus, Pool C, cc.	...	...	217	290	175
Pneumococcus, Pool D, cc.	...	...	206	279	163
Pneumococcus, Pool E, cc.	...	...	201	285	161
Pneumococcus, Pool F, cc.	...	...	205	277	162
Measles					
Placental Extract, vials	2,163	1,304	3,299	3,248	2,666
Sodium Citrate Solution, vials	943	713	535	725	860
Meningitis					
Antimeningoccocic Serum, 15 cc. doses	3,339	1,781	1,888	2,201	1,157
Antimeningococcic Serum, Conc. 15 cc. doses	87	2	24	20	51
Influenza (Pfeiffer Bacillus) Antiserum, vials	2,118	2,488	2,796	2,562	1,666
Influenza (Pfeiffer Bacillus) Antiserum, Bulk, cc.	100	...	...	1,200	5,300
Miscellaneous Serums					
Horse Serum, Normal, cc.	87,585	64,600	135,010	173,980	73,150
Enteric Fevers					
Typhoid Vaccine, cc.	54,471	...	...	54,926	45,576
Typhoid-Paratyphoid B vaccine, cc.	15,935	107,426	116,326	45,100	34,377

*5 vials Type 21; 10 vials each Types 10, 22, 28 and 32; 13 vials Type 6; 14 vials Type 15; 15 vials each Types 13, 16, 17; 18 vials Type 11; 19 vials Type 24; 20 vials Types 23 and 31; 21 vials each Types 12 and 27; 28 vials Type 20; 30 vials Type 19; 52 vials Type 29; 60 vials Type 25; 68 vials Type 9; 76 vials each Types 14 and 18; 80 vials Type 2; 222 vials Type 4 and 271 vials Type 3.

**28 vials Type 23; 29 vials each Types 10, 11, 16, 21, 22 and 25; 30 vials each Types 12, 13, 15, 24, 28, 29 and 31; 31 vials each Types 17, 27 and 32; 32 vials each Types 6, 19 and 20; 50 vials Type 18; 59 vials Type 9 and 86 vials Type 33.

Other Products

	1937	*1938*	*1939*	*1940*	*1941*
Smallpox Vaccine, capillary tubes	244,329	221,576	221,746	233,364	220,638
Tuberculin, ampoules — 0.7 cc.	1,826*	1,821**	1,812	1,769	1,484
Tuberculin, capillary tubes	11,625	12,730	9,185	12,045	9,145
Silver Nitrate Solution, ampoules	76,340	77,488	79,076	83,324	88,800
Serum Sensitivity Outfits	646	947	1,004	1,197	798
Serum Sensitivity Outfits (rabbit)	...	...	...	...	60
Trichina Antigen, ampoules	...	...	...	...	48
Normal Serum Albumin, cc.	...	...	...	...	18,388.5

Syphilis (See also table in report of Division of Genitoinfectious Diseases)

	1937	*1938*	*1939*	*1940*	*1941*
Arsphenamine, 0.4, 0.6, and 3.0 gm. ampoules	3,656	2,625	2,450	2,308	2,183
Sulpharsphenamine, 0.3, 0.6, 1.0# and 3.0 gm. ampoules	6,156	4,329	3,533	3,542	3,509
Neoarsphenamine, 0.3##, 0.45, 0.6, 0.9 gm. ampoules	70,071	67,047	63,490	48,339	36,861
Mapharsen, 0.04, 0.06, 0.4### and 0.6### gm. ampoules	10,855	13,280	21,835	37,465	39,234
Bismuth Salicylate in oil, 10 cc. bottles## and 2 oz. bottles	3,062	5,444	6,663	6,431	6,414
Sulfathiazole, tablets contained in 500 and 1,000 tablet bottles	...	...	...	...	66,500

Products not distributed in 1941

Scarlet Fever Convalescent Serum — 56 vials in 1937 and 3 in 1938
Scarlet Fever Streptococcus Toxin for immunization — 105 1 cc. doses in 1937 and 580 in 1938
Diagnostic Pneumococcus Type 5 Horse Serum — 15 cc. in 1937
Pneumococcus Vaccine, Type 7 — 150 cc. in 1938
Typhus Serum — 1,194 20 cc. vials in 1937
Typhus Serum — 230 cc. in 1937 and 1,000 cc. in 1939
Mumps Convalescent Serum — 110 cc. in 1939
Poliomyelitis Convalescent Serum — 633 vials in 1937 and 75 in 1938
Typhoid-Paratyphoid A and B vaccine — 116,743 cc. in 1937
Diagnostic Typhoid Serum — 12 cc. in 1937
Diagnostic Paratyphoid A serum — 17½ cc. in 1937
Diagnostic Paratyphoid B serum — 17½ cc. in 1937

*Of these ampoules 68 contained 204 cc. in all and 1,758 contained 0.7 cc. each.
**Of these ampoules 15 contained 5 cc. each and 1,806 contained 0.7 cc. each.
#Discontinued in 1937.
##Begun in 1937.
###Begun in 1939.

1. *Antipneumococcic Serum.* Limitation of serum therapy of pneumonia chiefly to patients who fail to respond to chemotherapy has resulted in a further drop in the distribution of this serum.

	Type 1 Units	*Type 2 Units*	*Type 5 Units*	*Type 7 Units*	*Type 8 Units*	*Type 14 Units**
1937	121,060,000	75,880,000	15,139,500	....	....	....
1938	85,550,000	36,524,000	27,384,500	32,280,000	5,640,000	....
1939	85,150,000	35,590,000	28,197,500	38,213,500	28,367,500	3,860,000
1940	54,420,000	27,025,000	22,320,000	23,840,000	22,640,000	3,520,000
1941	28,170,000	15,525,000	26,040,000	19,095,000	15,000,000	1,520,000

*Purchased.

Other types were not distributed prior to 1940, and, therefore, are not given in this table.

2. *Antimeningococcic Serum.* Chemotherapy and a continued low incidence of meningococcus meningitis combine to decrease the use of this product.
3. *Typhoid Vaccines.* An unusually small amount has been distributed, but with no apparent reason for the decrease.
4. *Other products.* Distribution figures are within normal limits.

8. Expenses

YEAR	PERSONAL SERVICES		EXPENSES		TOTAL	
	Appropriation	Spent	Appropriation	Spent	Appropriation	Spent
1937	$80,000.00	$77,339.61	$36,813.62	$34,423.30	$116,813.62	$111,762.91
1938	79,350.00	75,821.49	34,570.21	33,474.83	113,920.21	109,296.32
1939	79,300.00	77,524.02	34,496.14	33,561.18	113,796.14	111,085.20
1940	81,700.00	77,323.60	34,628.50	33,169.78	116,328.50	110,493.38
1941	79,500.00	74,748.20	36,774.28	35,896.46	116,274.28	110,644.66

4. Investigations

Assistance was rendered the Department of Physical Chemistry, Harvard Medical School, in the preparation of human serum albumin for use as a substitute for blood in transfusions. Laboratory and clinical knowledge concerning this product progressed to the point where a license for its distribution was granted to this laboratory by the Federal Security Agency on August 27, 1941.

II. WASSERMANN LABORATORY

WILLIAM A. HINTON, M.D., *Chief of Laboratory*

1. Tests and Examinations

KIND OF SPECIMEN		1937	1938	1939	1940	1941
Blood	Number of Specimens	215,293	254,195	295,114	360,401	425,581
	Tests:					
	Hinton	186,387	223,210	255,589	322,797	389,351
	Wassermann	8,912	6,173	–	–	–
	Davies Micro-Hinton	1,659	3,207	4,072	4,662	4,620
	Bacillus Abortus:					
	Agglutination*	25,431	27,184	29,787	30,380	31,431
	G.C. Compl. Fixation	9,196	10,396	11,101	9,146	679
	Glanders*	39	24	37	22	25
Spinal Fluid	Number of Specimens	8,910	9,740	10,430	11,784	10,934
	Tests:					
	Wassermann	8,911	9,740	10,435	11,784	10,934
	Davies-Hinton	835	3,865	5,097	6,154	8,774
	Gold Sol	546	500	–	–	–
Rabies Diagnosis*	Number of Specimens	460	295	302	306	269
	Tests:					
	Impressions	460	295	302	306	269
	Sections	455	289	296	298	255
	Animal Inoculation	275	230	248	240	232
Path. and Bact. Examinations*	Number of Specimens	7	7	10	8	3
	Tests:					
	Sections	2	4	4	–	–
	Animal Inoculation	5	2	7	1	2
	Cultures	1	1	5	4	2
	Smears	–	2	1	2	1
	Total Tests	243,114	285,122	316,981	385,796	446,575
	Total Specimens	224,670	264,237	305,856	372,496	437,067

*Diagnostic Examinations for Division of Livestock Disease Control.

As shown in the table, the total number of tests performed has increased nearly 16 per cent and in tests for syphilis nearly 20 per cent. This is chiefly attributable to tests for syphilis done for the National Guard and the Selective Service Boards (see below). Performance of the complement fixation test for the detection of gonorrhea was discontinued after February 1941, since it was felt that the test as done at that time was unreliable for such purposes as affect the public health.

2. Expenses

YEAR	PERSONAL SERVICES		EXPENSES		TOTAL	
	Appropriation	Spent	Appropriation	Spent	Appropriation	Spent
1937	$18,700.00	$18,549.68	$6,000.00	$6,012.02	$24,700.00	$24,561.70
1938	19,000.00	18,973.81	6,000.00	5,992.43	25,000.00	24,966.24
1939	19,300.00	17,093.21	6,200.00	6,177.46	25,500.00	23,270.67
1940	19,650.00	19,085.07	6,322.98	5,956.85	25,972.98	25,041.92
1941	20,050.00	18,164.48	6,332.50	6,248.93	26,382.50	24,413.41

3. *Laboratory Approval*

In the program for evaluating the performance of laboratories in the serologic detection of syphilis, approximately four hundred different sera have been sent out for testing. Thirty-six institutions have now been approved for testing blood from prospective blood donors, and sixteen institutions for performing routine serologic tests for syphilis. Besides sending specimens to those laboratories seeking approval, we are continuing to send specimens to those laboratories already approved, to ensure that they maintain a satisfactory rating in the performance of these tests.

4. *Investigations*

Work on the serology of syphilis in rabbits treated with arsphenamine has been continued. The reliability of the complement fixation test for gonorrhea is being reinvestigated at the urgent request of a small group of internists in our Boston hospitals who have expressed a need for this test as an aid in diagnosis in selected cases.

Representatives of the Wassermann Laboratory participated in an evaluation of serologic tests for syphilis held in Washington, D. C., by the American Serologic Congress. They performed the various Hinton technics and their modifications. The Wassermann Laboratory also participated in the regular National Evaluation of Serologic Tests for Syphilis, on invitation of the Surgeon General of the U. S. Public Health Service.

5. *New and Proposed Activities*

Serologic tests for syphilis on all draftees for the Selective Service System have amounted to 64,262. Tests for syphilis on members of the Massachusetts National Guard were performed on 2,553 specimens.

The performance of serologic tests for syphilis on persons applying for marriage licenses in Massachusetts is a service that has been in operation since November 1, 1941, in response to the new law (Chapter 601 of the Acts of 1941) requiring a medical examination and a blood test on all such persons. The application of this Act will result in many more specimens being submitted to this laboratory.

628 specimens from the American Red Cross Bleeding Clinic have been tested in connection with the serum albumin work at the Antitoxin and Vaccine Laboratory

THE DIVISION OF CHILD HYGIENE

M. Luise Diez, M.D., *Director*

Activities of the Division of Child Hygiene during the year ended December 31, 1941, were chiefly the following:

1. Maternal, Infant and Preschool Hygiene:

New requests for prenatal letters	8,609
Letters sent to fathers	8,609
New requests for postnatal letters, first year series	10,644
Registered for second year postnatal letters	15,515
Total number registered for all monthly letter services	34,768

Follow-up of mothers and babies discharged from Framingham Reformatory for Women continued, through service of Public Health Nursing Supervisors.

Mothers' classes conducted during the year by staff nurses	17
Mothers' classes conducted by local nurses	19
Fathers' classes conducted	3

Prenatal Clinics:

Plan started to secure X-rays of chest for pregnant women attending prenatal clinics. Visitation of local prenatal clinics was continued.

Courses for prenatal clinic physicians	2
Local prenatal clinic service fees paid physician (Westfield)	1

Delivery Nurse Service:

Home delivery nurse service fees paid	27

Maternal Mortality Study:

This year completed the five-year study of causes of maternal deaths in Massachusetts, as well as the study of Caesarean sections occurring in hospitals, carried on through cooperation of the Section of Obstetrics and Gynecology of the Massachusetts Medical Society.

Maternal deaths studies in 1941	220

Premature Infant Program:

The study of deaths of premature infants was continued.

Nursery supervisors taking course on care of premature infant	23

Well Child Conferences:

Physicians taking course for well child conference physicians	6
Well child conference sessions held by State Units	378
Towns covered by this service	67
Number of infant and preschool children examinations	3,583
Nursery school children included in examinations	651
Communities taking over such conferences locally	5
Local well child conferences where fees are paid to physician under Social Security funds	4

Summer Round-up:

Towns conducting Summer Round-Up conferences	139
Total examinations of children in such conferences	9,429

2. School Hygiene:

School physician for the Town of Millville was continued by a staff physician.

School hygiene surveys made	1
"Contact" issues distributed	5
School Physicians' and Superintendents' Conferences held	8

3. PUBLIC HEALTH NURSING.

An Institute on "Public Assistance in Massachusetts" was held for nurses and public welfare workers, in seven areas of the State, cooperating with the State Department of Public Welfare. Total attendance 731. Tuberculosis Institutes continued at State and County Sanatoria.

Promotion and stimulation of tuberculosis programs continued in 58 towns, including 83 visits to further tuberculosis nursing program.

Well child conference follow-up visits made	353
Home visits made in communities without nursing service	1,021
Home visits for maternity service	97
Home visits for tuberculosis follow-up	241
Home visits for arthritis study follow-up	31
School nursing survey, as part of school hygiene survey	1
Group conferences held relative to public health nursing	238
Study groups held	10
Toxoid clinics attended	94
Home visits for follow-up of Framingham Reformatory inmates	6
Birth certificates investigated, for Maternal Mortality Study	70
Lectures given on public health nursing subjects	81

Consultant service continued for local nursing associations, county public health associations, community health committees, boards of health, parent-teacher associations, town managers, and other social and lay groups.

Participation in program planning for the three State nursing organizations continued.

4. NUTRITION:

Attendance at Fifth Annual Conference of New England Nutritionists	95
Community nutritionists employed locally	7
Nutrition group meetings held	60
Nutrition service at prenatal clinics	16
Visits to tuberculosis clinics	9
Home visits for instruction and follow-up	243
Red Cross nutrition classes conducted	16
Radio talks given	18
Newspaper articles written and published	52
Visits made to further school lunch facilities	360
Number of towns included, school lunch activities	189
Consultant and field service for out-of-state workers	21

Members of the nutrition staff served on national, state and local committees concerned with promotion of adequate nutrition.

Cooperation continued with State Departments of Education, Public Welfare, the Extension Service, Red Cross, Girl Scouts, and State Public Safety Committee. Summer courses continued at State Teachers Colleges for teachers, nurses and school lunchroom managers.

5. DENTAL HYGIENE:

Dental surveys made in schools in 11 towns:

Number of children included in examinations	1,516
School hygiene dental survey made	1
Dental survey of camp children	1
Number of children included in this survey	164
Lectures to student nurses in training in hospitals	17
Dental examinations at well child conferences	12
Dental inspections at well child conferences	3,377

Participation in courses at Harvard School of Public Health, Harvard Dental School, Boston University Medical School, Tufts Dental School and Forsyth Dental Infirmary continued.

An eight-session course for dentists, in Children's Dentistry, was conducted in cooperation with the American Society for Children's Dentistry. This included lectures and demonstrations. Sixteen dentists took the course.

Cooperation and consultation service continued for national, state and local dental societies, and assistance was given the State Welfare Department in securing dental service for State wards.

6. PARENT EDUCATION:

Parent education courses were continued for teachers and nurses. Courses were given at Fitchburg State Teachers College, for advanced credit, a total of 10 lectures on "Problems of Adolescence."

The second course for lay leaders in Parent Education was carried on. These leaders carried on locally 27 community projects, supervised by the Parent Education Coordinator.

Annotated book lists were prepared and consultation service given.

7. CHILD GROWTH AND DEVELOPMENT SERVICE:

A program of case studies of preschool and school children was developed cooperating with the school superintendents in selected communities. Methods and techniques for hearing testing of preschool children were studied and plans made for perfecting these methods. The Clarke School for the Deaf and Massachusetts Eye and Ear Infirmarry cooperated in this work.

The Massachusetts Vision Test was approved by both State Departments of Education and Public Health, and introduced to the schools of the State. Reports were completed of studies and test materials.

8. SOCIAL WORK:

A study of economic and social factors involved in behavior problems reported from well child conferences by Department Units was carried on and is to be continued. A study of social resources, public and private, in small towns was made to form the basis of a permanent file of social resources.

Monthly group discussions for nurses were held in three centers. Consultation service was given directly and through group discussion of case problems.

9. AUDIOMETER TESTING:

Three audiometers were in constant use during the year.

Number of children having hearing tests by audiometer	41,580
Number showing hearing loss	1,750
Number requiring retesting	5,990

10. HEALTH EDUCATION:

Health talks given in high Schools	158
Number of high school pupils reached through this service	31,564
Number of communities where high school health study was conducted	45
Health exhibits at State Fairs	12
Exhibits at special conferences	11
Printed material distributed through State Fairs (pieces)	17,621
Pamphlets distributed through Boston Book Fair	12,779
Pamphlets distributed through schools	216,640
Lectures given by staff members	1,147
Communities reached through this service	212
Total number of persons reached	83,493

Cooperating with the University Extension Division, courses were given to teachers and school nurses. The Health Education Coordinator participated in a course at Forsyth Dental Infirmary. Other staff members participated in courses at Harvard School of Public Health, Harvard Dental School and Massachusetts General Hospital; also Fitchburg and Hyannis State Teachers Colleges. In-service training in health education was carried on for Board of Health nurses and dental hygienist and the visiting nurse association of Springfield. A workshop in health education was conducted for teachers in 9 towns.

A special School Health Study was begun this year, under the supervision of the Joint Committee on Health Education, sponsored by the State Departments of Education and Public Health and the School Superintendents' Association, School Principals' Association, and representatives of State medical and dental societies.

The Division participated in health exhibits for Massachusetts Medical Society, New England Health Institute, Public Welfare Convention, Boston Book Fair, State Nurses' Association, and county and local health associations.

"Illustrative Teaching Methods" for grades I, II, III, IV, V, and VI, were printed, in cooperation with the State Department of Education.

Staff education through special courses and field observation trips was afforded to various staff members.

The usual advisory committees were called upon during the year for advice and counsel.

MASSACHUSETTS STATISTICS FOR 1941
(Allocated)

Birth rate per 1,000 population	16.2
Death rate per 1,000 population	11.7
Infant mortality rate per 1,000 live births	35.3
Maternal mortality rate per 1,000 live births	2.9
Population estimated as of June 30, 1941	4,325,106

THE DIVISION OF COMMUNICABLE DISEASES

ROY F. FEEMSTER, M.D., Dr. P.H., *Director*

GENERAL STATEMENT

Although only statistical tables are included in this summary, a number of the activities of the division are touched upon in the Commissioner's section.

Discovery of Typhoid Carriers

Year	Cases of Typhoid	Carriers Added to List	Rate per 100 Cases	Carriers Found in Investigation of Cases	Rate per 100 Cases	Epidemiological Units#	Per Cent of Units in Which Carrier Was Found
1937 .	114	20	17.5*	16	14.0	96**	16.7
1938 .	59	19	32.2*	16	27.1	55**	29.1
1939 .	78	26	33.3*	21	26.9	66**	31.8
1940 .	86	19	22.1*	12	13.9	59**	20.3
1941 .	68	22	32.4*	18	26.4	63**	28.6

#All cases resulting from the same source are counted as a single unit in this column.

*No adjustment has been made for those cases in which disease was probably contracted outside of state numbering as follows: 1937 — 10; 1938 — 2; 1939 — 5; 1940 — 3; 1941 — 3.

**1937 — 1 unit comprising 1 case caused by known carrier.
1938 — 1 unit comprising 1 case caused by known carrier.
1939 — 2 units comprising 2 cases caused by known carriers.
1940 — 6 units comprising 11 cases caused by known carriers.
1941 — 4 units comprising 9 cases caused by known carriers.

OUTBREAKS

Disease	Month	Location	Cases	Vehicle	Diagnosis Confirmed by Lab. Work	Etiological Agent	Remarks
Diphtheria .	Mar.	Springfield	7 (4 rept.)	U*	5	–	In family of 11 children (4 clinical and 3 subclinical)
Dysentery .	June	Lynn	12	U	12	Flexner	–
Dysentery .	July	Dunstable	106	U	106	Flexner	Summer camp.
Dysentery .	July	Middleborough	40	U	12	Sonne	Summer camp.
Dysentery .	July–Nov.	Worcester State Hospital	84	U	84	Sonne	–
Dysentery .	July–Dec.	Fernald State School	26	U	26	Flexner	–
Dysentery .	Sept.	Ipswich	Several	U	5	Flexner	In 2 families on dairy farms.
Dysentery .	Oct.	Ayer	18	U	4	Flexner	–
Dysentery .	Oct.	Melrose	10	U	7	Flexner	Employees in hospital.
Food Poisoning	Dec.	Fall River	8	Muffins	Yes	Sodium fluoride	Muffins served in restaurant.
Gastroenteritis	Jan.	Boston	110	Roast turkey?	–	U*	Banquet.
Gastroenteritis	Feb.	Weymouth	5	U	–	U	In 1 household of 6 persons.
Gastroenteritis	May	Andover	9	U	–	U	In 1 household of 14 persons.
Gastroenteritis	May	Andover	5	U	–	U	5 of 13 employees.
Gastroenteritis	June	Fall River	Many	Water?	–	U	Contaminated water supply in factory.
Gastroenteritis	June	Worcester State Hospital	322	Hamburg and spaghetti	–	U	–
Gastroenteritis	July	Salisbury	40	Water?	–	–	Summer residents.
Gastroenteritis	July	S.S. Washington	Few	Contact	–	U	Refugees.
Gastroenteritis	July	Pembroke	60	Salmon salad?	–	Staph. aureus and albus	Girls' summer camp.
Gastroenteritis	Aug.	Boston	9	U	–	–	At Fort Dawes.
Gastroenteritis	Aug.	Haverhill	Several	U	–	U	Newborn infants in hospital.
Gastroenteritis	Aug.	Plymouth	135	Chop suey?	–	Probably staph. ent.	Camp at Manomet.

*U—Undetermined mode of transmission or etiological agent.

OUTBREAKS — *Continued*

Disease	Month	Location	Cases	Vehicle	Diagnosis Confirmed by Lab. Work	Etiological Agent	Remarks
Gastroenteritis	Aug.	Windsor	Few	U	–	U	Members of 5 families residing on large farm.
Gastroenteritis	Oct.	Natick-Newton	4	Chocolate eclairs	–	Staph. ent.	–
Gastroenteritis	Oct.	Northampton	6	U	–	U	College students.
Gastroenteritis	Oct.	Pittsfield	Several	Eclairs	–	Staph. ent.	In different families.
Gastroenteritis	Oct.	Worcester	30	Roast turkey?	–	Probably staph. ent.	Banquet
Gastroenteritis	Nov.	Boston	10	Cream-filled pastry	–	Staph. ent.	Pastry bought at restaurant.
Gastroenteritis	Nov.	Williamstown	17	U	–	U	Private school.
Gastroenteritis	Dec.	Weymouth	13	U	–	U	Newborn infant in hospital.
Infectious jaundice	Sept.	W. Brookfield	10	U	No		–
Meningitis	June	Camp Edwards	8	–	8	Meningococcus	–
Salmonella	Apr.	Metropolitan State Hospital	9	U	9	Montevideo, 7 Urbana, 1 Oranienburg, 1	Among inmates.
Salmonella	May	Malden	4	U	4	Typhimurium	Family group.
Scarlet fever	Mar.–Apr.	Boston-Winthrop	15	–	–	–	At Fort Banks.
Scarlet fever, sore throat	July	Burlington	81	Ham	15	Hemol. strep. type 2.	Church luncheon.
Scarlet fever, sore throat	Aug.	Foxborough State Hospital	7	U	–	–	7 cases on 4 different wards.
Trichinosis	Feb.	Framingham	4	Pork chops	–	–	1 family.
Trichinosis	June	Camp Edwards	14	U	–	–	–
Trichinosis	Dec.	Attleboro	5	U	–	–	1 family.
Typhoid	May	Boston	3	Water	3	–	Boys drank standing surface water Typhoid carrier lived nearby.
Undulant fever	Mar.-Sept.	Leominster	16	Raw milk	16	Br. abortus	All cases drank raw milk from 1 dairy.

*U—Undetermined mode of transmission or etiological agent.

TABLE I.— *Anterior Poliomyelitis*

YEAR	Cases	Case Rate per 100,000	Deaths	Death Rate per 100,000	Fatality Rate (Per Cent)
1937	351	8.0	22	0.5	6.3
1938	18	0.4	7	0.1	38.9
1939	76	1.7	4	0.1	5.3
1940	45	1.0	2	0.04	4.4
1941	182	4.2	6	0.1	3.3

TABLE II.— *Diphtheria*

1937	175	4.0	18	0.4	10.3
1938	159	3.6	19	0.4	11.9
1939	197	4.4	15	0.3	7.6
1940	144	3.3	8	0.2	5.6
1941	123	2.8	12	0.3	9.8

TABLE III.— *Measles*

1937	21,136	479.9	28	0.6	0.1
1938	10,533	238.0	13	0.3	0.1
1939	26,685	600.1	16	0.3	0.1
1940	21,698	502.6	11	0.3	0.1
1941	22,338	516.5	4	0.1	...

Table IV.— *Meningitis, Meningococcal*

Year	Cases	Case Rate per 100,000	Deaths	Death Rate per 100,000	Fatality Rate (Per Cent)
1937	166	3.8	72	1.6	43.4
1938	59	1.3	18	0.4	30.5
1939	48	1.1	17	0.4	35.4
1940	47	1.1	15	0.3	31.9
1941	98	2.3	25	0.6	25.5

Table V.— *Pneumonia, Lobar*

1937	5,322	120.8	1,846	41.9	34.7
1938	4,296	97.1	1,312	29.6	30.5
1939	4,460	100.3	1,211	27.2	27.1
1940	4,332	100.4	925	21.4	21.4
1941	3,617	83.6	860	19.9	23.8

Table VI.— *Scarlet Fever*

1937	8,480	192.5	38	0.9	0.4
1938	10,146	229.3	24	0.5	0.2
1939	5,705	128.3	15	0.3	0.3
1940	5,277	122.2	19	0.4	0.4
1941	7,141	165.1	13	0.3	0.2

Table VII.— *Tuberculosis, Pulmonary*

1937	3,534	80.2	1,761	40.0	...
1938	3,220	72.8	1,536	34.7	...
1939	2,959	66.5	1,505	33.8	...
1940	2,816	65.2	1,484	34.4	...
1941	2,987	69.1	1,520	35.1	...

Table VIII.— *Tuberculosis, Nonpulmonary*

1937	363	8.2	126	2.9	...
1938	375	8.5	141	3.2	...
1939	310	7.0	97	2.2	...
1940	294	6.8	114	2.6	...
1941	295	6.8	112	2.6	...

Table IX.— *Typhoid Fever*

1937	114	2.6	13	0.3	11.4
1938	59	1.3	11	0.2	18.6
1939	78	1.7	11	0.2	14.1
1940	86	2.0	8	0.2	9.3
1941	68	1.6	3	0.1	4.4

Table X.— *Whooping Cough*

1937	13,333	302.7	95	2.1	0.7
1938	5,818	131.5	35	0.8	0.6
1939	7,548	169.7	45	1.0	0.6
1940	7,959	184.4	22	0.5	0.3
1941	9,790	226.4	40	0.9	0.4

TABLE XI.— *Number and Kind of Specimens*

	1937	*1938*	*1939*	*1940*	*1941*
Diphtheria	6,104	6,923	7,104	6,614	5,463
Gonorrhea	13,621	12,725	12,942	13,070	12,590
Malaria	48	58	51	50	48
Pneumonia	1,950	3,602	3,965	3,608	3,207
Tuberculosis	5,186	6,392	6,479	7,565	6,937
Typhoid Fever:					
Widal	3,713	2,642	3,311	3,037	2,730
Culture	9,268	7,852	12,766	12,814	11,019
Undulant Fever	1,393	1,871	1,933	1,966	2,686
Miscellaneous	1,911	1,147	1,018	1,368	1,699
Total	43,194	43,212	49,569	50,092	46,379

TABLE XII.— *Specimens and Examinations for 1941*

	Positive	Negative	Total Number of Specimens	Total Number of Examinations
Diphtheria:				
Diagnosis	53	4,729	4,782	11,788[1]
Release	139	542	681	681
Gonorrhea	1,251	11,339	12,590	25,180[2]
Malaria	–	48	48	48
Meningococci, Spinal fluid for	9	43	52	96[3]
Pneumonia:				
Pneumococci found and typed	1,094	–	1,094	1,094
Pneumococci not found	–	2,113	2,113	2,213
Tuberculosis:				
Sputum	576	5,624	6,200	6,200
Urine, spinal fluid, etc. (Culture and animal inoculations)	80	657	737	737
Typhoid Fever:				
Widal	80	2,650[4]	2,730	5,899[5]
Culture (blood, feces, urine, etc.)	317	10,702	11,019	17,046[6]
Undulant Fever	177	2,509	2,686	8,058[7]
Miscellaneous:				
Diphtheria virulence tests	20	3	23	23
Dysentery agglutination tests	1	155	156	156
Dysentery, Amoebic	–	54	54	54
Vincent's angina (sent by dentists)	709	312	1,021	1,021
Weil-Felix reaction for Rickettsial diseases	16	99	115	115
Unclassified	–	–	278	413[8]
			46,379	80,822

[1] Includes examinations for hemolytic streptococci and the organisms of Vincent's angina.
[2] Includes examinations for average number of leucocytes per field.
[3] Includes examinations for influenza bacilli and other organisms.
[4] Includes 194 partial reactions.
[5] Includes 439 agglutination tests for paratyphoid A and 2,730 tests for paratyphoid B.
[6] Includes examinations for paratyphoid and dysentery bacilli.
[7] Includes examinations for agglutinins for typhoid and paratyphoid B.
[8] Includes miscellaneous examinations for identification of organisms.

TABLE XIII.— *Pneumococcus Type Differentiation*

Type	Number	Per Cent	Type	Number	Per Cent
1	93	8.1	20	37	3.2
2	31	2.7	21	13	1.1
3	150	13.1	22	12	1.0
4	56	4.9	23	27	2.4
5	34	3.0	24	22	1.9
6	62	5.4	25	3	0.3
7	65	5.7	27	4	0.4
8	92	8.0	28	16	1.4
9	26	2.3	29	41	3.6
10	22	1.9	31	9	0.8
11	37	3.2	32	1	0.1
12	8	0.7	33	28	2.4
13	29	2.5	Buckley	16	1.4
14	25	2.2	Carver	13	1.1
15	26	2.3	Dougherty	1	0.1
16	17	1.5	Reilly	10	0.9
17	27	2.4			
18	27	2.4	Typed pneumococci	1,144	100.0
19	64	5.6	No pneumococci	2,113	
			Total	3,257[1]	

[1] 71 specimens with more than one type.

TABLE XIV.— *Laboratory Examinations for Rabies**

YEAR	POSITIVE		Negative	Total Animals Examined
	Dogs	Other Animals		
1937	158	6	247	460
1938	49	1	233	255
1939	31	1	264	304
1940	52	4	244	309
1941	20	1	240	274

*Wassermann Laboratory.

Cases and Deaths, with Case and Death Rates per 100,000 Population[1] for Reportable Diseases During the Year 1941

DISEASE	Cases	Case Rate per 100,000 Population	Deaths	Death Rate per 100,000 Population	Fatality Rate (Per Cent)
Actinomycosis	4	.1	2	*	50.0
Anterior poliomyelitis	182	4.2	6	.1	3.3
Anthrax	7	.2	1	*	14.3
Chicken pox	11,808	273.0	4	.1	*
Diphtheria	123	2.8	12	.3	9.8
Dog bite	11,038	255.2	–	–	–
Dysentery, Amebic	4	.1	–	–	–
Dysentery, Bacillary	303	7.0	6	.1	2.0
Encephalitis, Infectious	21	.5	13	.3	61.9
German measles	2,334	54.0	–	–	–
Gonorrhea	3,791	87.7	7	.2	.2
Malaria	10	.2	1	*	10.0
Measles	22,338	516.5	4	.1	*
Meningitis, Meningococcal	98	2.3	25	.6	25.5
Meningitis, Pfeiffer bacillus	14	**	21	.5	**
Meningitis, Other forms	22	***	–	–	–
Mumps	10,491	242.6	6	.1	.1
Ophthalmia neonatorum	481	11.1	–	–	–
Suppurative Conjunctivitis	492	11.4	–	–	–
Paratyphoid infections	77	1.8	1	*	1.3
Pellagra	18	.4	7	.2	38.9
Pneumonia, Lobar	3,617	83.6	860	19.9	23.8
Scarlet fever	7,141	165.1	13	.3	.2
Septic sore throat	171	4.0	22	.5	12.9
Syphilis	4,613	106.7	267	6.2	5.8
Tetanus	19	.4	5	.1	26.3
Trachoma	24	.6	–	–	–
Trichinosis	50	1.2	–	–	–
Tuberculosis, Pulmonary	2,987	69.1	1,520	35.1	50.9
Tuberculosis, Other forms	295	6.8	112	2.6	38.0
Tuberculosis, Hilum	184	4.3	–	–	–
Tularemia	1	*	–	–	–
Typhoid fever	68	1.6	3	.7	4.4
Typhus	2	*	–	–	–
Undulant fever	86	2.0	2	*	2.3
Whooping cough	9,790	226.4	40	.9	.4
Total	92,704	2,143.4	2,960	68.4	

[1] Population, 4,325,108.

*Less than .05.

**Incompletely reported.

***Made reportable May, 1941.

Cases and Deaths for all Reportable Diseases by Months — 1941

	Jan.		Feb.		March		April		May		June		July		August		September		October		November		December		Total	
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
Actinomycosis	–	–	–	–	–	1	–	–	–	–	–	–	–	–	1	–	–	–	2	1	1	–	–	–	4	2
Anterior poliomyelitis	–	–	–	–	1	–	1	–	–	–	1	–	5	–	45	2	66	2	46	1	10	1	7	–	182	6
Anthrax	–	–	1	–	–	–	–	–	–	–	2	1	–	–	1	–	–	–	2	–	–	–	1	–	7	1
Chicken pox	1574	–	1103	–	1408	–	1181	1	1270	1	1170	1	519	–	125	–	106	–	571	–	1172	–	1603	1	11808	4
Diphtheria	9	1	6	–	8	–	14	1	9	–	11	–	9	1	6	1	10	–	8	3	14	2	19	3	123	12
Dog bite	511	–	531	–	655	–	1280	–	1259	–	1205	–	1280	–	998	–	1153	–	857	–	687	–	550	–	11038	–
Dysentery, Amebic	–	–	–	–	1	–	1	–	–	–	1	–	–	–	1	–	–	–	–	–	–	–	–	–	4	–
Dysentery, Bacillary	3	–	12	–	3	–	1	–	2	1	14	–	24	–	29	2	110	2	43	–	46	–	16	1	303	6
Encephalitis, infectious	1	1	1	–	2	1	3	2	–	3	2	1	1	–	3	3	2	–	2	1	3	1	1	–	21	13
German measles	63	–	89	–	147	–	523	–	640	–	535	–	116	–	31	–	28	–	35	–	59	–	68	–	2334	–
Gonorrhea	263	–	282	1	324	–	315	–	319	2	302	–	344	–	283	1	403	2	351	–	332	–	273	1	3791	7
Malaria	–	–	5	–	1	–	1	–	1	–	1	–	–	–	1	1	–	–	–	–	–	–	–	–	10	1
Measles	1887	1	1896	–	3126	–	4012	–	4118	1	3923	2	1420	–	281	–	168	–	373	–	456	–	678	–	22338	4
Meningitis, meningococcal	3	1	6	2	10	5	6	2	8	5	16	3	5	–	3	2	8	1	8	2	14	1	11	1	98	25
Meningitis, Pfeiffer bacillus	3	3	–	3	1	1	1	1		1	1	4	2	2	1	–	–	–	1	1	2	1	2	4	14	21
Meningitis, pneumococcal++											–	–	5	–	2	–	2	–	1	–	3	–	4	–	17	–
Meningitis, other forms++											–	–	1	–	1	–	–	–	1	–	2	–	–	–	5	–
Mumps	836	1	696	–	1349	–	1492	–	1479	3	1113	–	533	–	273	1	233	–	335	–	692	1	1460	–	10491	6
Ophthalmia neonatorum*	158	–	82	–	83	–	109	–	76	–	56	–	100	–	60	–	59	–	59	–	49	–	82	–	973	–
Paratyphoid infections	5	–	4	–	3	–	7	–	23	–	5	–	4	–	9	–	2	–	6	–	5	–	4	1	77	1
Pellagra	1	–	2	–	–	1	1	1	1	–	1	–	2	1	2	–	3	–	–	2	3	–	2	2	18	7
Pneumonia, lobar	1052	218	461	103	309	102	390	75	210	66	207	36	155	35	74	22	106	32	192	40	193	60	208	71	3617	860
Scarlet fever	586	–	528	1	650	2	874	5	823	–	639	2	232	–	195	1	243	–	460	1	734	1	1171	–	7141	13
Septic sore throat	16	3	26	2	23	–	23	1	19	1	16	–	8	1	3	1	2	1	11	7	8	2	16	3	171	22
Syphilis	296	32	344	18	402	24	410	26	437	24	391	22	388	16	341	24	361	27	450	16	389	23	335	15	4013	267
Tetanus	–	–	1	–	–	–	1	–	3	1	5	2	1	–	1	–	1	–	1	1	3	–	2	1	19	5
Trachoma	3	–	4	–	3	–	2	–	1	–	1	–	1	–	2	–	1	–	3	–	2	–	1	–	24	–
Trichinosis	1	–	6	–	1	–	1	–	–	–	15	–	–	–	2	–	8	–	2	–	2	–	12	–	50	–
Tuberculosis, pulmonary	209	166	176	136	285	134	268	132	303	124	204	126	204	133	200	90	229	109	289	110	199	128	241	132	2987	1520
Tuberculosis, other forms	26	9	12	11	27	5	25	11	30	10	22	11	28	16	24	11	23	5	29	6	23	8	26	9	295	112
Tuberculosis, hilum	15	–	11	–	21	–	20	–	11	–	24	–	9	–	20	–	5	–	11	–	10	–	27	–	184	–
Tularemia	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	1	–
Typhoid fever	4	–	3	–	3	1	1	–	9	–	7	–	4	–	8	–	7	–	11	–	2	1	9	1	68	3
Typhus fever	–	–	–	–	1	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2	–
Undulant fever	5	–	5	–	6	–	13	–	12	–	6	1	4	–	13	–	8	–	6	–	5	–	3	1	86	2
Whooping cough	1076	3	930	4	909	6	807	4	1157	2	978	2	650	6	575	6	546	3	555	2	710	1	828	1	9700	40
Total	8606	439	7223	281	9942	283	11790	262	12220	245	10994	214	6069	211	3674	168	3893	184	4727	194	5830	231	7661	248	92704	2960

* Includes suppurative conjunctivitis figures.

++ Made reportable May 13, 1941.

Cases of Reportable Diseases by Ages for 1941

Disease	Under 1 Year	1 year	2 years	3 years	4 years	5 years	6 years	7 years	8 years	9 years	10 to 14 years	15 to 19 years	20 to 24 years	25 to 29 years	30 to 39 years	40 to 49 years	50 to 59 years	60 to 69 years	70 years and over	Age Unknown	Total	Male	Female
Actinomycosis	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	4	–	–	–	–	4	3	1
Anterior poliomyelitis	3	5	10	16	9	24	11	9	11	7	33	16	9	5	12	2	–	–	–	–	182	116	66
Anthrax	–	–	–	–	–	–	–	–	–	–	–	1	2	1	1	1	–	1	–	–	7	6	1
Chicken pox	338	468	594	726	911	1373	2188	1514	1130	623	1111	179	66	48	52	16	5	–	1	465	11808	6233	5575
Diphtheria	–	5	9	12	15	8	10	11	8	6	15	6	1	3	4	4	2	2	2	–	123	65	58
Dysentery, Amebic	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	2	–	1	–	4	1	3
Dysentery, Bacillary	1	5	5	2	1	5	7	4	21	19	60	37	17	6	25	21	22	19	26	–	303	186	117
Encephalitis, Infectious	–	1	–	–	4	2	–	1	–	2	2	3	1	1	2	1	1	–	–	–	21	9	12
German measles	51	93	76	72	48	83	123	119	107	76	373	485	353	122	59	9	3	–	–	82	2234	1332	1002
Gonorrhea	8	1	6	6	3	5	1	2	8	4	10	339	1287	928	792	259	84	26	3	19	3791	3006	785
Hookworm	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Leprosy	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Malaria	–	–	–	–	–	–	–	–	–	–	–	–	2	–	2	5	1	–	–	–	10	8	2
Measles	420	1020	1262	1677	1864	2601	3634	2832	1891	1167	2100	547	249	118	93	25	8	5	3	822	22338	11736	10602
Meningitis, Meningococcal	13	7	4	3	3	1	1	1	4	1	6	8	12	13	10	5	4	2	–	–	98	62	36
Meningitis, Pfeiffer bacillus	6	1	3	1	–	–	1	–	–	–	–	–	–	–	1	–	1	–	–	–	14	11	3
Mumps	32	158	255	424	564	948	1575	1274	1147	739	1984	442	171	120	196	76	26	13	7	340	10491	5742	4749
Paratyphoid infections	4	4	1	–	2	1	2	–	2	1	7	8	4	3	5	17	5	7	4	–	77	44	33
Pellagra	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	4	8	3	2	–	18	13	5
Pneumonia, Lobar	95	58	72	49	46	50	45	33	24	25	115	159	179	177	410	456	529	498	467	130	3617	2190	1427
Rabies	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Rocky Mountain spotted fever	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Scarlet fever	36	133	315	466	585	715	844	659	562	472	1318	338	173	113	152	48	16	7	2	187	7141	3652	3489
Septic sore throat	1	3	4	2	2	5	6	6	4	4	23	11	31	14	25	15	11	2	2	–	171	70	101
Smallpox	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Syphilis	15	3	2	2	1	7	6	7	4	8	39	129	439	517	978	1008	882	436	95	35	4613	2794	1819
Tetanus	1	–	1	–	1	1	1	1	2	–	3	2	2	1	–	–	1	1	1	–	19	16	3
Trachoma	–	–	–	–	–	1	–	–	1	–	3	1	–	1	–	5	7	3	2	–	24	16	8
Trichinosis	–	–	–	–	–	–	–	–	2	1	3	7	16	7	7	5	2	–	–	–	50	30	20
Tuberculosis, Pulmonary	3	3	10	5	5	6	3	2	4	3	32	187	333	309	532	482	412	239	124	293	2987	1825	1162
Tuberculosis, Other forms	3	9	8	5	4	4	6	3	3	4	18	30	20	30	35	38	28	21	10	16	295	126	169
Tuberculosis, Hilum	2	2	3	5	7	4	7	11	5	6	37	15	14	13	21	13	6	4	1	8	184	84	100
Tularemia	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	1	1	–
Typhoid fever	–	–	–	2	1	2	2	3	3	1	8	11	8	6	11	3	6	1	–	–	68	37	31
Typhus fever	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	1	–	–	–	2	1	1
Undulant fever	–	–	–	1	–	1	–	1	1	1	2	4	10	11	22	12	9	7	4	–	86	54	32
Whooping cough	654	741	908	986	1060	1040	1383	957	575	342	533	55	13	19	29	11	2	4	6	472	9790	4816	4974

Cases of Reportable Diseases by Counties — 1941

DISEASE	Barnstable	Berkshire	Bristol	Dukes	Essex	Franklin	Hampden	Hampshire	Middlesex	Nantucket	Norfolk	Plymouth	Suffolk	Worcester	Total
Actinomycosis	–	–	–	–	–	–	1	–	2	–	–	–	1	–	4
Anterior poliomyelitis	6	6	36	–	27	–	6	6	32	–	11	17	18	17	182
Anthrax	–	–	–	–	3	–	2	–	1	–	–	–	–	1	7
Chicken pox	60	162	481	–	1,672	379	926	130	2,604	1	892	344	2,905	1,252	11,808
Diphtheria	1	–	52	–	7	–	9	–	20	–	6	2	21	5	123
Dog bite	102	163	432	–	1,545	69	558	103	2,811	8	947	245	3,120	935	11,038
Dysentery, Amebic	–	–	–	–	–	–	–	–	–	–	–	–	2	2	4
Dysentery, Bacillary	–	1	4	–	45	–	2	5	163	–	1	1	10	71	303
Encephalitis, Infectious	–	–	5	–	2	–	3	–	5	–	1	2	1	2	21
German measles	247	33	76	1	219	40	97	116	546	–	126	129	388	316	2,334
Gonorrhea	163	58	200	4	301	26	285	15	909	1	116	109	1,431	173	3,791
Malaria	–	–	–	–	1	–	–	–	–	–	6	–	3	–	10
Measles	370	89	183	–	721	122	1,159	272	6,750	1	1,912	1,057	7,008	2,694	22,338
Meningitis, Meningococcus	12	1	11	–	6	–	3	2	13	–	12	9	13	16	98
Mumps	63	164	462	–	1,230	174	406	48	2,187	–	944	690	2,702	1,421	10,491
Ophthalmia neonatorum*	15	3	82	–	21	–	53	2	97	–	8	108	535	49	973
Paratyphoid infections	–	2	–	–	19	–	–	1	39	–	5	–	8	3	77
Pellagra	–	–	1	–	1	–	–	–	1	–	1	–	10	4	18
Pfeiffer bacillus meningitis	–	–	1	–	3	–	3	1	3	–	–	1	–	2	14
Pneumonia, Lobar	66	31	123	–	405	11	239	75	919	–	284	98	935	431	3,617
Scarlet fever	69	92	526	–	441	55	817	39	1,667	–	493	495	1,763	684	7,141
Septic sore throat	–	2	21	–	26	6	5	–	29	–	5	7	65	5	171
Syphilis	64	78	332	13	425	18	355	46	862	6	240	168	1,728	278	4,613
Tetanus	–	–	3	–	3	–	–	–	4	–	2	3	2	2	19
Trachoma	–	–	3	–	4	–	1	–	5	–	1	–	7	3	24
Trichinosis	17	–	7	–	2	–	–	–	8	–	–	1	12	3	50
Tuberculosis, Pulmonary	16	44	224	3	267	14	175	30	603	1	203	81	1,053	273	2,987
Tuberculosis, Other forms	4	4	27	1	29	–	17	4	64	–	13	9	97	26	295
Tularemia	–	–	–	–	1	–	–	–	–	–	–	–	–	–	1
Typhoid fever	1	1	4	–	6	1	6	–	11	–	5	4	22	7	68
Typhus fever	–	–	–	–	–	–	–	1	1	–	–	–	–	–	2
Undulant fever	1	8	3	–	4	6	1	2	14	–	4	6	2	35	86
Whooping cough	94	104	471	–	1,048	14	553	45	2,669	–	820	617	2,445	910	9,790

*Includes suppurative conjunctivitis.

Index to Line Numbers in the Table of Cases and Deaths from Diseases Dangerous to the Public Health, 1941

Abington	123
Acton	179
Acushnet	141
Adams	67
Agawam	93
Alford	343
Amesbury	76
Amherst	112
Andover	69
Arlington	26
Ashburnham	204
Ashby	277
Ashfield	291
Ashland	190
Athol	70
Attleboro	40
Auburn	108
Avon	201
Ayer	149
Barnstable	85
Barre	155
Becket	300
Bedford	143
Belchertown	153
Bellingham	173
Belmont	31
Berkley	271
Berlin	275
Bernardston	284
Beverly	33
Billerica	87
Blackstone	135
Blandford	310
Bolton	297
Boston	2
Bourne	159
Boxborough	323
Boxford	295
Boylston	251
Braintree	50
Brewster	292
Bridgewater	83
Brimfield	280
Brockton	15
Brookfield	253
Brookline	18
Buckland	246
Burlington	200
Cambridge	6
Camp Edwards	354
Canton	114
Carlisle	298
Carver	250
Charlemont	296
Charlton	185
Chatham	210
Chelmsford	86
Chelsea	25
Cheshire	234
Chester	265
Chesterfield	318
Chicopee	23
Chilmark	340
Clarksburg	262
Clinton	68
Cohasset	167
Colrain	248
Concord	91
Conway	287
Cummington	304
Dalton	140
Danvers	60
Dartmouth	82
Dedham	54
Deerfield	182
Dennis	219
Dighton	172
Douglas	181
Dover	254
Dracut	102
Dudley	133
Dunstable	313
Duxbury	192
East Bridgewater	145
East Brookfield	279
East Longmeadow	157
Eastham	306
Easthampton	79
Easton	126
Edgartown	255
Egremont	312
Erving	261
Essex	256
Everett	20
Fairhaven	73
Fall River	5
Falmouth	104
Fitchburg	22
Florida	317
Fort Banks	355
Fort Devens	356
Fort Rodman	357
Foxborough	118
Framingham	37
Franklin	103
Freetown	244
Gallups Island	358
Gardner	43
Gay Head	350
Georgetown	229
Gill	288
Gloucester	36
Goshen	338
Gosnold	348
Grafton	100
Granby	272
Granville	302
Great Barrington	122
Greenfield	52
Groton	186
Groveland	216
Hadley	187
Halifax	290
Hamilton	218
Hampden	274
Hancock	328
Hanover	175
Hanson	184
Hardwick	214
Harvard	223
Harwich	188
Hatfield	208
Haverhill	21
Hawley	337
Heath	326
Hingham	88
Hinsdale	267
Holbrook	161
Holden	144
Holland	336
Holliston	169
Holyoke	17
Hopedale	166
Hopkinton	180
Hubbardston	281
Hudson	92
Hull	209
Huntington	258
Ipswich	116
Kingston	177
Lakeville	228
Lancaster	171
Lanesborough	260
Lawrence	11
Lee	139
Leicester	128
Lenox	174
Leominster	39
Leverett	301
Lexington	63
Leyden	333
Lincoln	227
Littleton	235
Longmeadow	120
Lowell	9
Ludlow	90
Lunenburg	207
Lynn	10
Lynnfield	197
Malden	16
Manchester	191
Mansfield	111
Marblehead	71
Marion	217
Marlborough	58
Marshfield	189
Mashpee	315
Mattapoisett	240
Maynard	107
Medfield	136
Medford	14
Medway	162
Melrose	32
Mendon	259
Merrimac	202
Methuen	41
Middleborough	81
Middlefield	344
Middleton	194
Milford	55
Millbury	105
Millis	199
Millville	236
Milton	45
Monroe	342
Monson	124
Montague	99
Monterey	329
Montgomery	346
Mount Washington	352
Nahant	224
Nantucket	158
Natick	61
Navy Yard	359
Needham	66
New Ashford	351
New Bedford	7
New Braintree	316
New Marlborough	282
New Salem	327
Newbury	242
Newburyport	62
Newton	13
Norfolk	195
North Adams	38
North Andover	97
North Attleborough	77
North Brookfield	160
North Reading	170
Northampton	34
Northborough	193
Northbridge	78
Northfield	221
Norton	164
Norwell	222
Norwood	56
Oak Bluffs	241
Oakham	320
Orange	125
Orleans	249
Otis	325
Oxford	132
Palmer	80
Paxton	293
Peabody	42
Pelham	307
Pembroke	231
Pepperell	165
Peru	347
Petersham	285
Phillipston	309
Pittsfield	19
Plainfield	335
Plainville	264
Plymouth	65

Plympton	308
Princeton	299
Provincetown	148
Quincy	12
Randolph	95
Raynham	213
Reading	72
Rehoboth	178
Revere	30
Richmond	303
Rochester	263
Rockland	89
Rockport	152
Rowe	339
Rowley	245
Royalston	294
Russell	268
Rutland	212
Salem	24
Salisbury	196
Sandisfield	319
Sandwich	257
Saugus	59
Savoy	331
Scituate	138
Seekonk	127
Sharon	147
Sheffield	233
Shelburne	239
Sherborn	278
Shirley	183
Shrewsbury	96
Shutesbury	345
Somerset	121
Somerville	8
South Hadley	106
Southampton	286
Southborough	206
Southbridge	48
Southwick	243
Spencer	109
Springfield	4
Sterling	232
Stockbridge	226
Stoneham	74
Stoughton	84
Stow	266
Sturbridge	203
Sudbury	225
Sunderland	273
Sutton	176
Swampscott	75
Swansea	130
Taunton	28
Templeton	134
Tewksbury	119
Tewksbury State Infirmary	353
Tisbury	220
Tolland	349
Topsfield	270
Townsend	215
Truro	305
Tyngsborough	237
Tyringham	341
Upton	205
U. S. Marine Hospital, Boston	360
U. S. Marine Hospital, Chelsea	362
U. S. Marine Hospital, Tisbury	361
Uxbridge	117
Wakefield	31
Wales	324
Walpole	101
Waltham	27
Ware	98
Wareham	115
Warren	156
Warwick	314
Washington	332
Watertown	29
Wayland	151
Webster	64
Wellesley	53
Wellfleet	289
Wendell	322
Wenham	269
West Boylston	230
West Bridgewater	163
West Brookfield	252
West Newbury	247
West Springfield	47
West Stockbridge	276
West Tisbury	334
Westborough	113
Westfield	46
Westford	146
Westhampton	321
Westminster	211
Weston	150
Westover Field	363
Westport	142
Westwood	154
Weymouth	35
Whately	283
Whitman	94
Wilbraham	168
Williamsburg	238
Williamstown	137
Wilmington	131
Winchendon	110
Winchester	57
Windsor	330
Winthrop	49
Woburn	44
Worcester	3
Worthington	311
Wrentham	129
Yarmouth	198

Line No.	Cities and Towns in Order of Population	Population Estimated as of July 1, 1941	Anterior Poliomyelitis		Chicken Pox		Diphtheria		Dog Bite		German Measles		Gonorrhea	
			Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
1	Massachusetts	4,325,108	182	6	11808	4	123	12	11038	–	2334	–	3791	7
	Cities of over 500,000													
2	Boston	769,520	16	1	2841	–	16	2	2873	–	362	–	1199	–
	Cities of over 150,000													
3	Worcester	193,493	6	–	636	–	2	–	593	–	191	–	74	–
	Cities of 100,000–150,000	*689,039*	*39*	*1*	*1910*	*1*	*62*	*8*	*1484*	–	*216*	–	*536*	*1*
4	Springfield	149,510	3	–	623	–	7	2	278	–	62	–	175	–
5	Fall River	115,445	3	–	229	–	48	3	157	–	19	–	51	–
6	Cambridge	110,534	8	–	818	–	1	1	551	–	89	–	87	–
7	New Bedford	110,060	18	1	70	–	1	–	101	–	32	–	101	1
8	Somerville	101,960	6	–	82	1	3	–	191	–	11	–	77	–
9	Lowell	101,530	1	–	88	–	2	2	206	–	3	–	45	–
	Cities and Towns of 50,000–100,000	*615,706*	*27*	*1*	*1606*	*1*	*3*	*1*	*1617*	–	*177*	–	*330*	*1*
10	Lynn	97,600	7	–	396	–	–	–	331	–	28	–	74	–
11	Lawrence	84,235	1	1	76	–	–	–	132	–	6	–	66	–
12	Quincy	76,285	5	–	436	–	–	–	211	–	16	–	29	–
13	Newton	70,446	2	–	222	–	–	–	186	–	46	–	38	–
14	Medford	63,500	2	–	97	–	1	1	148	–	10	–	26	–
15	Brockton	62,162	8	–	146	–	–	–	107	–	25	–	23	1
16	Malden	58,005	2	–	97	1	1	–	249	–	26	–	35	–
17	Holyoke	53,403	–	–	41	–	–	–	100	–	5	–	26	–
18	Brookline	50,070	–	–	95	–	1	–	153	–	15	–	13	–
	Cities and Towns of 25,000–50,000	*574,207*	*21*	–	*1055*	–	*16*	*1*	*1407*	–	*113*	–	*301*	*1*
19	Pittsfield	49,684	4	–	34	–	–	–	60	–	3	–	36	–
20	Everett	46,582	–	–	20	–	1	–	81	–	4	–	34	–
21	Haverhill	46,509	4	–	70	–	–	–	205	–	13	–	35	–
22	Fitchburg	41,965	1	–	15	–	1	–	18	–	1	–	22	–
23	Chicopee	41,382	–	–	62	–	–	–	69	–	2	–	18	–
24	Salem	40,947	1	–	108	–	–	–	127	–	10	–	18	–
25	Chelsea	40,692	1	–	25	–	4	–	131	–	9	–	21	–
26	Arlington	40,500	–	–	205	–	1	–	138	–	13	–	10	–
27	Waltham	40,115	–	–	44	–	4	–	63	–	1	–	24	–
28	Taunton	37,398	4	–	1	–	2	1	3	–	–	–	11	–
29	Watertown	35,490	1	–	117	–	2	–	144	–	6	–	18	–
30	Revere	34,247	–	–	2	–	1	–	34	–	–	–	32	1
31	Belmont	27,500	–	–	137	–	–	–	139	–	18	–	4	–
32	Melrose	25,603	3	–	96	–	–	–	72	–	21	–	5	–
33	Beverly	25,593	2	–	119	–	–	–	123	–	12	–	13	–
	Cities and Towns of 10,000–25,000	*729,853*	*29*	–	*1945*	*1*	*11*	–	*1959*	–	*546*	–	*302*	–
34	Northampton	24,845	–	–	71	–	–	–	48	–	96	–	7	–
35	Weymouth	24,240	–	–	17	–	–	–	86	–	1	–	10	–
36	Gloucester	24,028	–	–	10	–	1	–	76	–	–	–	8	–
37	Framingham	23,339	1	–	83	–	1	–	108	–	44	–	20	–
38	North Adams	22,285	–	–	23	–	–	–	50	–	2	–	2	–
39	Leominster	22,277	1	–	42	–	–	–	59	–	4	–	4	–
40	Attleboro	22,108	2	–	44	–	–	–	89	–	11	–	11	–
41	Methuen	21,980	5	–	121	–	–	–	46	–	3	–	6	–
42	Peabody	21,756	–	–	22	–	1	–	39	–	3	–	20	–
43	Gardner	20,306	–	–	30	1	–	–	42	–	1	–	9	–
44	Woburn	19,786	–	–	31	–	–	–	6	–	1	–	9	–
45	Milton	18,991	–	–	87	–	–	–	43	–	6	–	3	–
46	Westfield	18,670	–	–	10	–	–	–	47	–	1	–	8	–
47	West Springfield	17,191	1	–	75	–	1	–	20	–	5	–	6	–
48	Southbridge	17,145	–	–	27	–	–	–	10	–	1	–	2	–
49	Winthrop	16,758	–	–	36	–	–	–	82	–	4	–	9	–
50	Braintree	16,460	–	–	46	–	–	–	106	–	4	–	9	–
51	Wakefield	16,212	1	–	1	–	–	–	63	–	4	–	10	–
52	Greenfield	15,693	–	–	278	–	–	–	50	–	1	–	10	–
53	Wellesley	15,585	1	–	86	–	–	–	86	–	59	–	7	–
54	Dedham	15,554	1	–	6	–	–	–	11	–	2	–	2	–
55	Milford	15,468	–	–	2	–	–	–	45	–	–	–	7	–
56	Norwood	15,424	–	–	1	–	–	–	37	–	2	–	3	–
57	Winchester	15,376	–	–	32	–	–	–	58	–	11	–	6	–
58	Marlborough	15,100	–	–	4	–	–	–	1	–	1	–	2	–
59	Saugus	14,840	1	–	43	–	3	–	84	–	17	–	10	–
60	Danvers	14,330	2	–	2	–	–	–	13	–	3	–	4	–
61	Natick	13,883	2	–	27	–	1	–	82	–	101	–	3	–
62	Newburyport	13,771	–	–	168	–	2	–	31	–	2	–	8	–
63	Lexington	13,652	–	–	15	–	–	–	47	–	8	–	8	–

Lobar Pneumonia		Measles		Menin. Meningitis		Mumps		Ophthalmia Neonatorum		Scarlet Fever		Syphilis		Tuberculosis, Pulmonary		Tuberculosis, Other Forms		Typhoid Fever		Whooping Cough		
Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Line No.
3617	860	22338	4	98	25	10491	6	973	–	7141	13	4613	267	2987	1520	295	112	68	3	9790	40	1
890	220	6203	–	13	2	2571	1	532	–	1698	–	1600	64	1003	458	90	25	18	1	2271	10	2
177	42	1331	–	5	2	839	–	42	–	405	–	121	12	132	58	12	5	3	1	376	–	3
527	*112*	*2405*	*1*	*9*	*6*	*751*	–	*181*	–	*1248*	*2*	*799*	*50*	*482*	*291*	*57*	*22*	*10*	–	*1328*	*9*	
106	21	855	1	–	1	95	–	52	–	451	–	232	15	73	36	8	3	3	–	359	2	4
61	15	56	–	1	2	255	–	57	–	406	2	74	6	76	58	8	4	4	–	158	3	5
196	32	904	–	1	1	207	–	27	–	85	–	182	9	109	57	12	6	2	–	496	1	6
28	11	24	–	7	1	140	–	21	–	21	–	149	7	83	53	9	6	–	–	153	1	7
80	19	527	–	–	–	14	–	3	–	255	–	87	4	69	40	13	2	1	–	89	–	8
56	14	39	–	–	–	39	1	21	–	30	–	75	9	72	47	7	1	–	–	73	2	9
549	*140*	*3482*	*1*	*14*	*3*	*1765*	–	*133*	–	*1041*	*2*	*536*	*40*	*365*	*174*	*36*	*16*	*7*	–	*1564*	*5*	
98	35	75	–	2	–	503	–	16	–	158	2	98	10	70	42	5	1	–	–	215	–	10
26	21	95	–	–	–	8	–	1	–	10	–	79	4	56	20	9	2	–	–	70	2	11
112	14	520	–	4	1	366	–	1	–	139	–	64	6	55	21	5	3	–	–	270	–	12
65	17	687	–	–	–	229	–	2	–	75	–	59	2	20	17	2	4	2	–	283	–	13
60	11	334	–	1	–	34	–	3	–	90	–	47	2	41	15	6	3	2	–	140	1	14
49	9	761	1	7	2	424	–	106	–	344	–	50	1	22	11	4	–	1	–	258	–	15
40	12	683	–	–	–	25	–	2	–	91	–	61	5	37	19	3	1	–	–	178	–	16
62	11	107	–	–	–	48	–	1	–	109	–	34	6	35	19	1	1	1	–	42	2	17
37	10	220	–	–	–	128	–	1	–	25	–	44	4	29	10	1	1	1	–	108	–	18
495	*109*	*1852*	–	*7*	*6*	*1336*	–	42	–	*485*	*2*	*497*	*23*	*289*	*160*	*30*	*15*	*10*	–	*1044*	*2*	
7	7	8	–	–	–	21	–	2	–	16	1	30	2	18	9	1	1	–	–	30	–	19
41	11	81	–	1	–	41	–	2	–	75	–	47	3	21	16	4	1	–	–	47	–	20
56	9	23	–	–	–	160	–	–	–	69	–	66	3	15	11	1	1	2	–	145	–	21
43	12	12	–	2	3	23	–	1	–	13	–	26	–	30	15	1	–	1	–	52	–	22
17	2	65	–	2	1	28	–	–	–	58	1	25	2	31	13	4	1	2	–	16	–	23
53	13	39	–	–	–	140	–	–	–	19	–	30	2	16	11	1	1	–	–	98	1	24
27	10	216	–	–	–	94	–	2	–	17	–	44	4	26	14	4	1	2	–	14	1	25
34	7	515	–	–	–	92	–	2	–	38	–	26	1	17	10	2	1	2	–	164	–	26
79	6	186	–	1	1	89	–	1	–	42	–	30	2	25	6	1	–	–	–	28	–	27
7	7	–	–	1	–	–	–	–	–	10	–	52	1	24	24	4	2	–	–	1	–	28
20	5	128	–	–	–	127	–	–	–	29	–	32	1	20	11	2	4	–	–	94	–	29
3	8	37	–	–	1	6	–	–	–	11	–	41	1	19	10	2	1	–	–	13	–	30
19	–	331	–	–	–	362	–	27	–	10	–	13	–	5	3	1	1	–	–	201	–	31
31	5	169	–	–	–	122	–	3	–	63	–	14	–	9	5	–	–	–	–	44	–	32
58	7	42	–	–	–	31	–	2	–	15	–	21	1	13	2	2	–	1	–	97	–	33
483	*109*	*3627*	*1*	*20*	*3*	*1391*	*3*	*19*	–	*1124*	4	*449*	*36*	*338*	*189*	*41*	*13*	*10*	–	*1602*	*8*	
28	2	40	–	–	–	20	–	2	–	10	–	18	5	9	10	2	1	–	–	13	–	34
9	2	32	–	2	–	1	–	1	–	16	–	11	–	11	9	–	–	–	–	21	–	35
7	3	6	–	1	–	12	–	1	–	1	–	19	–	17	12	2	–	–	–	10	–	36
35	4	273	–	3	–	223	–	–	–	143	1	9	1	17	9	1	–	–	–	118	1	37
15	8	–	–	–	–	9	–	–	–	36	–	10	–	9	5	1	–	1	–	1	–	38
9	3	12	–	–	–	10	–	–	–	21	–	17	1	7	6	1	–	–	–	9	1	39
17	4	32	–	–	–	3	–	–	–	32	1	13	1	11	7	1	–	–	–	73	–	40
8	6	24	–	–	–	22	–	1	–	15	–	20	–	15	8	2	2	–	–	55	1	41
24	1	17	1	–	–	165	–	–	–	17	–	17	1	12	11	2	1	–	–	31	1	42
28	2	12	–	–	–	2	–	3	–	3	–	12	3	7	6	1	–	1	–	33	1	43
7	6	34	–	2	–	–	–	–	–	36	–	15	–	7	6	1	2	1	–	16	–	44
3	1	287	–	1	–	41	–	–	–	23	–	16	–	6	2	1	–	–	–	41	–	45
9	3	17	–	–	–	11	1	–	–	25	–	18	1	14	4	1	–	–	–	–	–	46
6	1	77	–	–	–	124	–	–	–	67	–	6	–	8	7	3	–	–	–	91	–	47
10	4	3	–	–	–	18	–	1	–	48	–	9	–	8	2	–	–	–	–	1	–	48
15	2	545	–	–	–	29	–	1	–	21	–	7	–	5	3	1	–	2	–	146	1	49
15	3	90	–	3	–	139	–	1	–	11	–	15	2	12	3	1	–	–	–	102	–	50
9	1	247	–	–	–	78	1	–	–	27	–	10	1	9	3	–	–	–	–	57	–	51
2	3	7	–	–	–	159	–	–	–	23	–	11	5	6	2	–	1	–	–	7	–	52
15	2	155	–	–	–	22	1	–	–	21	–	13	2	6	2	–	–	1	–	61	–	53
5	1	171	–	–	–	4	–	–	–	27	–	5	–	4	5	–	–	–	–	17	–	54
15	1	4	–	1	–	17	–	1	–	2	–	10	1	4	3	1	–	–	–	14	–	55
16	4	65	–	1	–	19	–	2	–	19	–	9	1	5	–	–	–	1	–	3	–	56
11	–	45	–	–	–	12	–	–	–	54	–	12	–	4	5	–	–	–	–	49	–	57
3	3	350	–	–	–	34	–	–	–	39	–	10	–	3	2	–	–	–	–	17	–	58
4	1	192	–	–	–	15	–	–	–	15	–	6	–	9	4	–	–	–	–	62	–	59
19	4	2	–	–	–	2	–	–	–	6	–	7	1	6	1	3	1	1	–	21	1	60
11	4	47	–	–	–	40	–	1	–	175	–	8	1	1	3	1	1	–	–	162	–	61
8	2	4	–	–	–	2	–	–	–	8	–	11	–	2	1	–	–	–	–	35	–	62
28	2	136	–	–	–	7	–	–	–	4	–	6	–	32	3	5	–	–	–	17	–	63

Line No.	Cities and Towns in Order of Population	Population Estimated as of July 1, 1941	Anterior Poliomyelitis		Chicken Pox		Diphtheria		Dog Bite		German Measles		Gonorrhea	
			Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
64	Webster	13,209	–	–	15	–	1	–	1	–	58	–	7	–
65	Plymouth	13,106	–	–	35	–	–	–	21	–	1	–	11	–
66	Needham	12,643	–	–	35	–	–	–	63	–	7	–	4	–
67	Adams	12,598	1	–	20	–	–	–	12	–	1	–	5	–
68	Clinton	12,394	–	–	8	–	–	–	10	–	–	–	1	–
69	Andover	11,265	1	–	102	–	–	–	27	–	64	–	4	–
70	Athol	11,242	–	–	13	–	–	–	–	–	–	–	9	–
71	Marblehead	11,128	–	–	75	–	–	–	90	–	8	–	3	–
72	Reading	11,002	–	–	28	–	–	–	33	–	1	–	7	–
73	Fairhaven	10,937	1	–	–	–	–	–	–	–	–	–	5	–
74	Stoneham	10,852	1	–	54	–	–	–	60	–	3	–	5	–
75	Swampscott	10,812	–	–	77	–	–	–	36	–	3	–	–	–
76	Amesbury	10,734	–	–	31	–	–	–	41	–	1	–	10	–
77	North Attleborough	10,378	2	–	–	–	–	–	–	–	–	–	4	–
78	Northbridge	10,307	1	–	–	–	–	–	–	–	1	–	3	–
79	Easthampton	10,190	4	–	12	–	–	–	–	–	–	–	1	–
	TOWNS OF 5,000–10,000	*339,232*	*16*	–	*804*	*1*	*6*	–	*502*	–	*161*	–	*169*	*1*
80	Palmer	9,097	–	–	2	–	1	–	–	–	1	–	5	–
81	Middleborough	9,084	1	–	8	–	–	–	5	–	6	–	1	–
82	Dartmouth	9,039	–	–	18	–	–	–	23	–	5	–	3	–
83	Bridgewater	8,884	–	–	19	–	–	–	21	–	37	–	5	–
84	Stoughton	8,684	–	–	10	–	1	–	18	–	2	–	6	–
85	Barnstable	8,465	1	–	5	–	–	–	27	–	5	–	15	–
86	Chelmsford	8,208	–	–	7	–	–	–	12	–	1	–	3	–
87	Billerica	8,189	1	–	6	–	–	–	19	–	–	–	1	–
88	Hingham	8,170	–	–	81	–	2	–	34	–	–	–	1	–
89	Rockland	8,157	–	–	–	–	–	–	4	–	–	–	1	–
90	Ludlow	8,095	–	–	45	–	–	–	1	–	2	–	6	–
91	Concord	8,033	–	–	72	–	–	–	9	–	2	–	1	–
92	Hudson	7,990	–	–	–	–	–	–	–	–	–	–	4	–
93	Agawam	7,934	–	–	5	–	–	–	–	–	2	–	7	–
94	Whitman	7,774	–	–	1	–	–	–	1	–	–	–	4	–
95	Randolph	7,769	–	–	–	–	–	–	–	–	–	–	4	–
96	Shrewsbury	7,669	–	–	6	–	–	–	–	–	2	–	–	–
97	North Andover	7,594	–	–	61	–	–	–	25	–	9	–	2	–
98	Ware	7,578	2	–	–	–	–	–	–	–	–	–	–	–
99	Montague	7,521	–	–	8	1	–	–	10	–	–	–	3	–
100	Grafton	7,509	–	–	1	–	–	–	2	–	–	–	2	–
101	Walpole	7,463	1	–	1	–	–	–	5	–	–	–	–	–
102	Dracut	7,391	–	–	1	–	–	–	12	–	–	–	1	–
103	Franklin	7,335	–	–	21	–	–	–	3	–	1	–	2	–
104	Falmouth	7,130	3	–	12	–	–	–	35	–	7	–	17	–
105	Millbury	6,985	–	–	5	–	–	–	28	–	14	–	–	–
106	South Hadley	6,866	–	–	11	–	–	–	21	–	3	–	1	–
107	Maynard	6,770	–	–	3	–	–	–	3	–	–	–	7	–
108	Auburn	6,689	–	–	77	–	1	–	1	–	3	–	2	–
109	Spencer	6,686	1	–	65	–	–	–	5	–	3	–	4	–
110	Winchendon	6,621	–	–	55	–	–	–	10	–	1	–	3	–
111	Mansfield	6,550	–	–	25	–	–	–	25	–	1	–	1	–
112	Amherst	6,475	–	–	29	–	–	–	19	–	17	–	2	–
113	Westborough	6,468	–	–	2	–	–	–	9	–	5	–	–	1
114	Canton	6,451	–	–	10	–	–	–	39	–	1	–	6	–
115	Wareham	6,447	4	–	3	–	–	–	–	–	–	–	25	–
116	Ipswich	6,440	–	–	1	–	–	–	–	–	14	–	2	–
117	Uxbridge	6,433	1	–	13	–	–	–	12	–	1	–	2	–
118	Foxborough	6,421	–	–	11	–	1	–	14	–	5	–	1	–
119	Tewksbury	6,344	–	–	17	–	–	–	7	–	1	–	2	–
120	Longmeadow	5,958	–	–	13	–	–	–	20	–	3	–	–	–
121	Somerset	5,931	–	–	7	–	–	–	–	–	–	–	3	–
122	Great Barrington	5,812	–	–	22	–	–	–	6	–	4	–	4	–
123	Abington	5,688	–	–	–	–	–	–	–	–	–	–	1	–
124	Monson	5,680	–	–	42	–	–	–	–	–	2	–	1	–
125	Orange	5,640	–	–	2	–	–	–	–	–	–	–	6	–
126	Easton	5,115	1	–	1	–	–	–	17	–	1	–	2	–
	TOWNS OF 2,500–5,000	220,849	*15*	*8*	*461*	–	*5*	–	*349*	–	*121*	–	*85*	*2*
127	Seekonk	4,930	–	–	–	–	–	–	–	–	–	–	–	–
128	Leicester	4,901	–	–	–	–	–	–	–	–	–	–	–	–
129	Wrentham	4,809	–	–	7	–	2	–	7	–	–	–	–	–
130	Swansea	4,776	2	–	–	–	–	–	3	–	–	–	1	–
131	Wilmington	4,723	–	–	1	–	–	–	–	–	–	–	1	–
132	Oxford	4,706	–	–	19	–	–	–	16	–	5	–	2	–
133	Dudley	4,659	1	–	–	–	–	–	–	–	–	–	1	–
134	Templeton	4,656	–	–	–	–	–	–	1	–	–	–	1	–

Dangerous to the Public Health, 1941 — Continued.

Lobar Pneumonia		Measles		Menin. Meningitis		Mumps		Ophthalmia Neonatorium		Scarlet Fever		Syphilis		Tuberculosis, Pulmonary		Tuberculosis, Other Forms		Typhoid Fever		Whooping Cough		
Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Line No.
2	2	10	–	–	–	8	–	1	–	8	–	4	1	2	7	2	2	–	–	–	–	64
3	3	88	–	–	–	18	–	–	–	29	–	9	1	4	3	1	–	–	–	49	–	65
13	1	20	–	–	–	21	–	2	–	14	–	4	1	7	5	–	–	–	–	58	1	66
3	–	3	–	–	–	5	–	1	–	7	–	8	–	6	4	1	1	–	–	–	–	67
5	2	11	–	–	–	1	–	–	–	4	–	4	1	3	2	1	–	–	–	–	–	68
3	2	71	–	–	–	22	–	–	–	13	–	1	–	3	1	1	–	–	–	49	–	69
8	1	182	–	–	–	14	–	–	–	7	–	9	–	4	2	–	–	–	–	13	–	70
6	1	37	–	–	–	6	–	–	–	16	–	7	1	4	4	–	–	2	–	27	–	71
12	–	12	–	2	–	1	–	–	–	24	–	7	–	3	2	1	–	–	–	6	–	72
–	2	–	–	1	1	3	–	–	–	1	–	9	–	7	–	2	–	–	–	1	1	73
6	3	209	–	–	–	24	–	–	–	2	–	9	1	8	3	1	–	–	–	77	–	74
4	–	13	–	–	–	25	–	–	–	16	–	6	1	3	1	–	–	–	–	14	–	75
8	1	6	–	–	–	2	–	–	–	32	–	7	–	4	1	–	–	–	–	20	–	76
–	2	–	–	–	–	–	–	–	–	2	2	4	1	1	3	–	1	–	–	–	–	77
5	3	2	–	2	1	–	–	–	–	3	–	2	1	4	4	–	–	–	–	1	–	78
14	3	37	–	1	1	1	–	–	–	1	–	9	–	9	3	–	–	–	–	4	–	79
228	*63*	*1415*	*1*	*10*	*1*	*813*	*1*	*19*	–	*535*	*1*	*218*	–	*179*	*88*	*13*	*7*	*3*	–	*753*	*4*	
8	–	4	–	1	–	4	–	–	–	27	–	5	–	4	1	–	–	–	–	9	–	80
3	2	6	–	–	–	113	–	–	–	7	–	10	4	2	4	1	–	1	–	101	–	81
2	–	4	–	1	–	19	–	3	–	–	–	7	1	8	2	–	–	–	–	17	–	82
18	2	5	–	–	–	5	–	–	–	10	–	2	–	21	4	–	1	–	–	31	–	83
2	2	35	–	–	–	18	–	–	–	113	–	3	1	7	3	1	1	1	–	13	–	84
1	4	31	–	1	1	2	–	14	–	7	–	5	–	6	2	–	–	–	–	12	–	85
4	3	6	–	–	–	2	–	–	–	1	–	–	–	2	3	–	–	–	–	3	–	86
3	–	9	–	–	–	–	–	–	–	13	–	7	–	2	1	–	–	–	–	9	–	87
4	1	40	–	–	–	5	–	–	–	38	–	10	–	5	–	1	–	–	–	12	–	88
1	1	3	–	–	–	–	–	–	–	3	–	5	–	4	1	–	–	–	–	1	–	89
3	1	1	–	–	–	23	–	–	–	10	–	6	–	–	5	–	–	–	–	12	–	90
2	2	112	–	–	–	6	–	1	–	7	–	5	–	1	1	–	–	–	–	32	–	91
–	1	–	–	–	–	–	–	–	–	2	–	7	–	–	3	–	–	–	–	1	–	92
6	–	2	–	–	–	31	1	–	–	37	–	10	–	–	2	–	–	–	–	13	–	93
1	–	1	–	–	–	–	–	1	–	2	–	3	–	4	2	–	–	–	–	6	–	94
3	1	–	–	1	–	–	–	–	–	1	–	7	–	5	–	–	–	–	–	–	–	95
10	3	87	–	–	–	24	–	–	–	3	–	1	–	4	2	–	–	–	–	11	–	96
1	1	2	–	–	–	2	–	–	–	–	–	–	–	10	3	–	–	–	–	13	–	97
3	1	–	–	1	–	–	–	–	–	–	–	3	1	1	2	–	–	–	–	12	1	98
–	–	3	–	–	–	–	–	–	–	14	–	1	–	5	1	–	–	–	–	1	–	99
25	–	6	–	–	–	2	–	–	–	–	–	4	–	29	–	–	–	–	–	1	–	100
5	2	67	–	–	–	16	–	–	–	5	–	–	1	2	–	1	–	–	–	3	–	101
–	1	1	–	–	–	1	–	–	–	1	–	1	–	1	3	–	–	–	–	–	1	102
1	3	3	–	–	–	16	–	–	–	2	–	8	1	–	–	1	–	–	–	1	–	103
4	3	19	1	–	–	8	–	–	–	15	–	15	2	3	–	–	–	–	–	49	–	104
6	1	37	–	–	–	5	–	–	–	3	–	–	–	2	2	–	–	–	–	7	–	105
9	3	14	–	–	–	8	–	–	–	23	–	–	–	5	2	1	2	–	–	10	–	106
4	3	77	–	–	–	11	–	–	–	3	–	2	–	1	1	–	–	–	–	6	–	107
7	1	83	–	–	–	161	–	–	–	18	–	2	1	2	2	1	–	–	–	77	–	108
4	2	24	–	1	–	5	–	–	–	8	–	1	–	3	3	–	–	1	–	20	1	109
5	–	232	–	–	–	11	–	–	–	16	–	4	–	6	1	–	–	–	–	63	–	110
2	1	15	–	–	–	–	–	–	–	6	–	7	–	1	2	–	–	–	–	17	1	111
6	1	122	–	–	–	4	–	–	–	1	–	7	1	2	2	1	–	–	–	–	–	112
9	–	174	–	–	–	39	–	–	–	1	–	3	2	1	–	1	–	–	–	34	–	113
10	1	44	–	–	–	32	–	–	–	29	–	5	–	–	3	–	–	–	–	28	–	114
2	3	–	–	2	–	–	–	–	–	7	–	21	3	2	8	–	1	–	–	–	–	115
4	–	45	–	2	–	1	–	–	–	6	–	5	–	–	2	–	–	–	–	21	–	116
10	1	5	–	–	–	3	–	–	–	40	–	5	1	1	3	–	–	–	–	5	–	117
17	2	17	–	–	–	8	–	–	–	6	–	6	–	12	1	1	–	–	–	6	–	118
3	1	–	–	–	–	165	–	–	–	–	–	2	–	–	–	–	–	–	–	37	–	119
5	3	8	–	–	–	20	–	–	–	3	–	5	–	–	–	–	–	–	–	2	–	120
–	2	2	–	–	–	3	–	–	–	6	1	2	–	2	3	1	1	–	–	–	–	121
–	–	8	–	–	–	12	–	–	–	5	–	8	–	3	1	1	–	–	–	35	–	122
–	1	–	–	–	–	–	–	–	–	4	–	6	–	1	3	–	–	–	–	–	–	123
7	–	5	–	–	–	1	–	–	–	7	–	1	–	7	–	–	–	–	–	–	–	124
4	2	15	–	–	–	4	–	–	–	4	–	1	–	2	1	–	–	–	–	6	–	125
4	1	41	–	–	–	23	–	–	–	21	–	–	–	–	3	1	1	–	–	16	–	126
106	*35*	*1216*	–	*4*	*1*	*622*	–	*3*	–	*259*	*1*	*149*	*14*	*73*	*54*	*10*	*4*	*5*	–	*466*	*1*	
–	1	–	–	–	–	–	–	–	–	–	–	1	–	2	1	–	–	–	–	–	–	127
2	–	–	–	–	–	–	–	–	–	–	–	2	–	–	–	–	–	1	–	–	–	128
6	2	3	–	–	–	59	–	–	–	7	–	1	–	7	–	–	–	–	–	26	–	129
2	2	1	–	–	–	1	–	–	–	3	–	4	–	4	3	1	1	–	–	12	–	130
7	–	–	–	–	–	–	–	–	–	10	–	4	–	1	2	–	–	–	–	3	–	131
6	1	4	–	–	–	36	–	–	–	4	–	3	–	2	3	–	–	–	–	10	–	132
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	4	1	–	–	–	–	–	133
4	1	–	–	–	–	–	–	–	–	–	–	1	–	–	1	–	–	–	–	–	–	134

Line No.	CITIES AND TOWNS IN ORDER OF POPULATION	Population Estimated as of July 1, 1941	Anterior Poliomyelitis		Chicken Pox		Diphtheria		Dog Bite		German Measles		Gonorrhea	
			Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
135	Blackstone	4,554	–	–	–	–	–	–	–	–	–	–	–	–
136	Medfield	4,422	–	–	1	–	–	–	–	–	–	–	1	–
137	Williamstown	4,342	1	–	15	–	–	–	–	–	21	–	–	–
138	Scituate	4,256	–	–	–	–	–	–	–	–	–	–	–	–
139	Lee	4,242	–	–	27	–	–	–	12	–	–	–	2	–
140	Dalton	4,205	–	–	–	–	–	–	–	–	–	–	1	–
141	Acushnet	4,151	3	2	–	–	–	–	–	–	–	–	2	–
142	Westport	4,101	–	–	83	–	–	–	9	–	1	–	1	–
143	Bedford	3,957	–	–	–	–	–	–	10	–	–	–	2	–
144	Holden	3,930	–	–	21	–	–	–	16	–	3	–	–	–
145	East Bridgewater	3,862	–	–	38	–	–	–	16	–	44	–	6	–
146	Westford	3,857	–	–	1	–	–	–	2	–	–	–	3	–
147	Sharon	3,784	1	–	–	–	–	–	31	–	2	–	–	–
148	Provincetown	3,652	1	–	3	–	–	–	8	–	–	–	4	–
149	Ayer	3,635	–	–	37	–	–	–	8	–	6	–	4	–
150	Weston	3,623	–	–	3	–	–	–	21	–	–	–	1	–
151	Wayland	3,575	–	–	6	–	–	–	15	–	2	–	2	–
152	Rockport	3,548	–	–	–	–	–	–	38	–	–	–	–	–
153	Belchertown	3,548	–	–	–	–	–	–	5	–	–	–	–	–
154	Westwood	3,534	1	1	13	–	–	–	3	–	2	–	5	–
155	Barre	3,529	–	–	–	–	–	–	–	–	–	–	2	–
156	Warren	3,503	–	–	11	–	–	–	18	–	3	–	3	–
157	East Longmeadow	3,411	–	–	2	–	–	–	4	–	2	–	2	–
158	Nantucket	3,368	–	–	1	–	–	–	8	–	–	–	1	–
159	Bourne	3,367	1	–	24	–	1	–	4	–	2	–	3	–
160	North Brookfield	3,340	1	–	1	–	–	–	4	–	1	–	1	–
161	Holbrook	3,328	–	–	3	–	–	–	18	–	–	–	2	–
162	Medway	3,314	–	–	–	–	–	–	2	–	–	–	2	–
163	West Bridgewater	3,252	1	–	6	–	–	–	6	–	1	–	1	–
164	Norton	3,152	–	–	3	–	–	–	5	–	6	–	1	–
165	Pepperell	3,137	–	–	–	–	–	–	–	–	–	–	1	–
166	Hopedale	3,129	–	–	–	–	–	–	–	–	–	–	–	–
167	Cohasset	3,113	–	–	1	–	–	–	6	–	–	–	2	–
168	Wilbraham	3,081	1	–	1	–	–	–	10	–	1	–	4	–
169	Holliston	3,016	–	–	2	–	–	–	3	–	4	–	1	1
170	North Reading	3,003	–	–	–	–	–	–	–	–	–	–	4	–
171	Lancaster	2,970	–	–	22	–	–	–	–	–	–	–	–	–
172	Dighton	2,963	–	–	–	–	–	–	–	–	–	–	–	–
173	Bellingham	2,953	–	–	–	–	–	–	–	–	–	–	1	–
174	Lenox	2,901	–	–	–	–	–	–	4	–	–	–	–	–
175	Hanover	2,882	–	–	2	–	–	–	8	–	1	–	–	–
176	Sutton	2,824	–	–	–	–	–	–	–	–	–	–	1	–
177	Kingston	2,796	–	–	–	–	–	–	–	–	–	–	–	–
178	Rehoboth	2,751	–	–	–	–	1	–	–	–	–	–	2	–
179	Acton	2,727	–	–	3	–	1	–	16	–	–	–	–	–
180	Hopkinton	2,713	–	–	3	–	–	–	4	–	2	–	–	–
181	Douglas	2,669	–	–	74	–	–	–	–	–	1	–	–	–
182	Deerfield	2,661	–	–	8	–	–	–	1	–	5	–	2	–
183	Shirley	2,630	–	–	9	–	–	–	3	–	–	–	1	–
184	Hanson	2,617	1	–	–	–	–	–	–	–	2	–	4	–
185	Charlton	2,607	–	–	–	–	–	–	–	–	–	–	3	–
186	Groton	2,563	–	–	10	–	–	–	4	–	4	–	–	–
187	Hadley	2,564	–	–	–	–	–	–	–	–	–	–	–	–
188	Harwich	2,560	–	–	–	–	–	–	–	–	–	–	1	–
189	Marshfield	2,517	–	–	–	–	–	–	–	–	–	–	1	–
	TOWNS OF 1,000–2,500	*158,650*	*11*	–	*450*	–	*2*	–	*220*	–	*92*	–	*76*	*1*
190	Ashland	2,489	–	–	7	–	–	–	16	–	4	–	3	–
191	Manchester	2,452	1	–	8	–	–	–	1	–	–	–	–	–
192	Duxbury	2,441	–	–	–	–	–	–	–	–	–	–	2	–
193	Northborough	2,435	–	–	–	–	–	–	–	–	–	–	2	–
194	Middleton	2,426	–	–	–	–	–	–	–	–	–	–	–	–
195	Norfolk	2,401	1	–	1	–	1	–	5	–	–	–	–	–
196	Salisbury	2,398	–	–	88	–	–	–	21	–	–	–	8	–
197	Lynnfield	2,373	–	–	9	–	–	–	4	–	4	–	–	–
198	Yarmouth	2,347	–	–	2	–	–	–	10	–	2	–	1	–
199	Millis	2,345	–	–	1	–	–	–	–	–	–	–	2	–
200	Burlington	2,343	–	–	2	–	–	–	16	–	–	–	–	–
201	Avon	2,327	–	–	–	–	–	–	–	–	–	–	–	–
202	Merrimac	2,312	2	–	2	–	–	–	10	–	–	–	5	–
203	Sturbridge	2,283	–	–	9	–	–	–	–	–	–	–	–	–
204	Ashburnham	2,276	–	–	6	–	–	–	–	–	–	–	–	–
205	Upton	2,276	–	–	2	–	–	–	4	–	–	–	1	–
206	Southborough	2,238	2	–	14	–	–	–	1	–	5	–	–	–

Dangerous to the Public Health, 1941 — Continued

Lobar Pneumonia		Measles		Menin. Meningitis		Mumps		Ophthalmia Neonatorum		Scarlet Fever		Syphilis		Tuberculosis, Pulmonary		Tuberculosis, Other Forms		Typhoid Fever		Whooping Cough		
Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Line No.
1	1	–	–	–	–	–	–	–	–	1	–	–	–	–	1	1	–	–	–	–	–	135
–	–	69	–	–	–	2	–	–	–	–	–	2	–	7	1	–	–	–	–	16	–	136
1	–	21	–	–	–	1	–	–	–	4	–	6	2	2	1	–	–	–	–	3	–	137
–	1	1	–	–	–	–	–	–	–	–	–	6	–	2	2	1	–	1	–	–	–	138
–	1	–	–	–	–	96	–	–	–	7	–	3	–	1	1	–	–	–	–	–	–	139
–	–	–	–	–	–	–	–	–	–	–	–	3	–	–	1	–	–	–	–	–	–	140
–	–	–	–	–	–	–	–	1	–	–	–	2	–	1	2	–	–	–	–	–	–	141
–	–	3	–	–	–	14	–	–	–	6	–	1	2	1	1	–	–	–	–	16	–	142
2	1	1	–	–	–	6	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	143
10	1	97	–	–	–	34	–	–	–	11	–	2	–	1	–	–	–	–	–	5	–	144
2	–	34	–	–	–	12	–	–	–	11	–	4	1	–	–	–	–	–	–	30	–	145
–	–	1	–	–	–	2	–	–	–	1	–	1	–	2	1	–	–	–	–	18	–	146
1	1	27	–	–	–	27	–	–	–	6	–	6	–	4	1	–	–	–	–	3	–	147
–	–	7	–	–	–	32	–	1	–	5	–	2	1	–	–	–	–	–	–	22	–	148
6	1	17	–	–	–	1	–	–	–	17	–	7	–	2	–	–	–	1	–	7	–	149
3	1	38	–	–	–	66	–	–	–	–	–	1	–	–	–	–	–	–	–	38	–	150
–	–	16	–	–	–	57	–	–	–	31	1	1	–	–	2	–	–	–	–	3	–	151
–	–	3	–	–	–	1	–	–	–	1	–	–	–	5	1	–	–	–	–	–	–	152
6	1	2	–	–	–	–	–	–	–	–	–	1	–	1	1	–	–	–	–	–	–	153
2	–	52	–	–	–	4	–	–	–	6	–	1	–	1	–	–	–	1	–	2	–	154
2	1	67	–	1	–	–	–	–	–	3	–	–	–	3	–	–	–	–	–	1	–	155
8	3	4	–	–	–	28	–	–	–	3	–	1	1	2	2	–	–	–	–	20	–	156
2	1	7	–	–	–	5	–	–	–	13	–	1	–	1	2	–	1	–	–	4	–	157
–	–	1	–	–	–	–	–	–	–	–	–	6	2	1	1	–	–	–	–	–	–	158
6	2	192	–	1	–	6	–	–	–	8	–	6	1	–	1	1	–	–	–	3	–	159
1	1	41	–	–	–	4	–	–	–	4	–	–	–	2	–	1	–	–	–	3	–	160
2	2	7	–	–	–	4	–	–	–	1	–	5	–	2	–	–	–	–	–	12	–	161
1	–	–	–	–	–	7	–	–	–	6	–	1	2	2	1	1	1	–	–	11	–	162
–	2	56	–	–	–	19	–	–	–	2	–	6	–	–	–	1	–	–	–	29	–	163
–	–	5	–	–	–	–	–	–	–	2	–	2	–	1	1	–	–	–	–	6	1	164
–	–	–	–	–	–	–	–	–	–	13	–	1	–	1	1	–	–	–	–	–	–	165
–	1	–	–	1	1	5	–	–	–	5	–	1	–	–	1	–	–	–	–	6	–	166
1	1	10	–	–	–	2	–	–	–	6	–	7	–	1	1	–	–	–	1	9	–	167
1	–	6	–	–	–	–	–	–	–	5	–	–	–	–	1	–	–	–	–	1	–	168
3	–	3	–	–	–	1	–	–	–	4	–	2	–	–	–	–	–	–	–	6	–	169
1	1	4	–	–	–	1	–	–	–	4	–	3	–	–	1	–	–	–	–	–	–	170
2	–	3	–	–	–	1	–	–	–	2	–	3	–	–	1	–	–	–	–	43	–	171
–	–	–	–	–	–	1	–	–	–	3	–	1	–	2	2	–	–	–	–	1	–	172
–	–	7	–	–	–	–	–	–	–	–	–	2	–	–	–	–	–	–	–	–	–	173
–	–	1	–	1	–	1	–	–	–	1	–	2	–	–	–	–	–	–	–	4	–	174
5	–	4	–	–	–	70	–	–	–	11	–	1	–	3	3	–	–	–	–	12	–	175
–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	176
–	1	–	–	–	–	3	–	–	–	6	–	2	–	–	–	–	–	–	–	3	–	177
–	–	–	–	–	–	–	–	–	–	–	–	3	–	–	1	–	–	–	–	–	–	178
1	–	214	–	–	–	3	–	1	–	12	–	1	–	1	–	–	–	–	–	5	–	179
4	–	99	–	–	–	1	–	–	–	1	–	1	–	–	1	–	–	–	–	18	–	180
–	–	–	–	–	–	–	–	–	–	8	–	1	–	2	–	–	–	–	–	43	–	181
–	–	71	–	–	–	2	–	–	–	–	–	–	–	–	1	–	–	1	–	–	–	182
3	–	–	–	–	–	1	–	–	–	–	–	1	–	–	–	–	1	–	–	7	–	183
2	1	13	–	–	–	2	–	–	–	–	–	1	–	1	–	–	–	–	–	–	–	184
–	–	–	–	–	–	–	–	–	–	–	–	5	–	–	–	1	–	–	–	–	–	185
–	–	4	–	–	–	4	–	–	–	5	–	–	–	–	–	–	–	–	–	5	–	186
–	1	–	–	–	–	–	–	–	–	–	–	1	–	–	2	–	–	–	–	–	–	187
–	–	–	–	–	–	–	–	–	–	–	–	9	1	1	–	1	–	–	–	–	–	188
–	–	–	–	–	–	–	–	–	–	–	–	8	–	1	–	–	–	–	–	–	–	189
78	*30*	*552*	–	*6*	*2*	*347*	–	*1*	–	*216*	*1*	*123*	*9*	*64*	*40*	*5*	*5*	*2*	–	*378*	*1*	
1	–	38	–	–	–	5	–	–	–	28	–	–	–	–	–	–	–	–	–	76	–	190
–	–	–	–	1	–	17	–	–	–	–	–	–	–	1	1	–	–	–	–	3	–	191
–	–	–	–	–	–	2	–	–	–	–	–	7	–	–	–	–	–	–	–	1	1	192
3	1	–	–	–	–	–	–	–	–	2	–	1	–	1	–	–	–	–	–	–	–	193
–	–	–	–	–	–	1	–	–	–	–	–	2	–	–	2	–	–	–	–	–	–	194
6	–	2	–	–	–	1	–	–	–	4	–	–	–	17	1	–	–	–	–	–	–	195
4	–	1	–	–	–	–	–	–	–	2	–	6	–	–	–	–	–	–	–	1	–	196
–	–	4	–	–	–	39	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	197
1	1	4	–	1	–	–	–	–	–	2	1	2	–	–	1	–	–	–	–	2	–	198
1	–	1	–	–	–	2	–	–	–	1	–	–	–	1	–	–	–	–	–	1	–	199
–	–	2	–	–	–	–	–	–	–	35	–	3	–	3	1	–	–	–	–	2	–	200
–	–	–	–	–	–	–	–	–	–	–	–	3	1	–	1	–	–	–	–	–	–	201
1	–	–	–	–	–	1	–	–	–	1	–	4	–	2	2	–	–	–	–	1	–	202
1	–	3	–	–	–	2	–	–	–	6	–	–	–	–	–	–	–	–	–	–	–	203
6	1	1	–	–	–	3	–	–	–	5	–	2	–	1	1	–	–	–	–	–	–	204
–	1	45	–	–	–	19	–	–	–	–	–	2	–	–	–	–	–	–	–	6	–	205
1	–	72	–	–	–	5	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	206

Line No.	Cities and Towns in Order of Population	Population Estimated as of July 1, 1941	Anterior Poliomyelitis		Chicken Pox		Diphtheria		Dog Bite		German Measles		Gonorrhea	
			Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
207	Lunenburg	2,228	–	–	5	–	–	–	1	–	1	–	–	–
208	Hatfield	2,185	–	–	7	–	–	–	4	–	–	–	2	–
209	Hull	2,182	–	–	1	–	–	–	8	–	10	–	5	–
210	Chatham	2,161	–	–	1	–	–	–	–	–	–	–	2	–
211	Westminster	2,151	–	–	–	–	–	–	–	–	–	–	–	–
212	Rutland	2,149	–	–	3	–	–	–	–	–	–	–	–	–
213	Raynham	2,141	–	–	–	–	–	–	–	–	–	–	–	–
214	Hardwick	2,117	1	–	1	–	–	–	4	–	8	–	1	–
215	Townsend	2,103	–	–	1	–	–	–	–	–	2	–	–	–
216	Groveland	2,096	–	–	2	–	–	–	3	–	6	–	–	–
217	Marion	2,078	–	–	4	–	–	–	5	–	1	–	11	–
218	Hamilton	2,037	–	–	–	–	–	–	–	–	–	–	2	–
219	Dennis	2,037	–	–	2	–	–	–	5	–	1	–	1	–
220	Tisbury	2,018	–	–	–	–	–	–	–	–	–	–	1	–
221	Northfield	1,985	–	–	6	–	–	–	4	–	8	–	–	–
222	Norwell	1,914	–	–	–	–	–	–	4	–	1	–	1	–
223	Harvard	1,890	–	–	29	–	–	–	4	–	–	–	–	–
224	Nahant	1,857	–	–	7	–	–	–	4	–	–	–	–	–
225	Sudbury	1,825	–	–	–	–	–	–	–	–	–	–	1	–
226	Stockbridge	1,821	–	–	1	–	–	–	4	–	2	–	2	–
227	Lincoln	1,818	–	–	–	–	–	–	–	–	–	–	–	–
228	Lakeville	1,805	1	–	–	–	–	–	2	–	–	–	–	–
229	Georgetown	1,798	–	–	59	–	–	–	20	–	–	–	–	–
230	West Boylston	1,786	–	–	3	–	–	–	–	–	–	–	–	–
231	Pembroke	1,745	–	–	–	–	–	–	–	–	–	–	–	–
232	Sterling	1,739	1	–	3	–	–	–	6	–	–	–	–	–
233	Sheffield	1,715	–	–	5	–	–	–	4	–	–	–	1	–
234	Cheshire	1,709	–	–	2	–	–	–	–	–	–	–	–	–
235	Littleton	1,676	–	–	1	–	–	–	–	–	–	–	–	–
236	Millville	1,675	–	–	–	–	–	–	–	–	–	–	–	–
237	Tingsborough	1,667	–	–	55	–	1	–	1	–	6	–	–	–
238	Williamsburg	1,659	–	–	–	–	–	–	1	–	–	–	–	–
239	Shelburne	1,647	–	–	16	–	–	–	3	–	3	–	–	–
240	Mattapoisett	1,620	–	–	–	–	–	–	–	–	–	–	–	–
241	Oak Bluffs	1,615	–	–	–	–	–	–	–	–	–	–	2	–
242	Newbury	1,606	–	–	–	–	–	–	–	–	–	–	–	–
243	Southwick	1,592	1	–	–	–	–	–	6	–	–	–	1	–
244	Freetown	1,576	–	–	–	–	–	–	–	–	–	–	1	1
245	Rowley	1,554	–	–	–	–	–	–	3	–	–	–	–	–
246	Buckland	1,530	–	–	–	–	–	–	–	–	–	–	–	–
247	West Newbury	1,512	–	–	–	–	–	–	1	–	–	–	1	–
248	Colrain	1,509	–	–	29	–	–	–	–	–	14	–	1	–
249	Orleans	1,484	–	–	–	–	–	–	7	–	1	–	1	–
250	Carver	1,479	1	–	–	–	–	–	2	–	–	–	–	–
251	Boylston	1,424	–	–	–	–	–	–	–	–	–	–	–	–
252	West Brookfield	1,403	–	–	1	–	–	–	7	–	1	–	3	–
253	Brookfield	1,398	–	–	11	–	–	–	3	–	1	–	1	–
254	Dover	1,395	–	–	3	–	–	–	–	–	1	–	2	–
255	Edgartown	1,381	–	–	–	–	–	–	–	–	–	–	–	–
256	Essex	1,374	–	–	–	–	–	–	1	–	–	–	–	–
257	Sandwich	1,352	–	–	–	–	–	–	–	–	–	–	–	–
258	Huntington	1,351	–	–	–	–	–	–	–	–	–	–	1	–
259	Mendon	1,340	–	–	–	–	–	–	–	–	–	–	–	–
260	Lanesborough	1,339	–	–	–	–	–	–	–	–	–	–	1	–
261	Erving	1,335	–	–	10	–	–	–	–	–	–	–	–	–
262	Clarksburg	1,319	–	–	–	–	–	–	–	–	–	–	–	–
263	Rochester	1,284	–	–	–	–	–	–	–	–	–	–	2	–
264	Plainville	1,267	–	–	–	–	–	–	–	–	–	–	–	–
265	Chester	1,262	–	–	–	–	–	–	1	–	–	–	–	–
266	Stow	1,255	–	–	–	–	–	–	1	–	–	–	–	–
267	Hinsdale	1,246	–	–	–	–	–	–	–	–	–	–	–	–
268	Russell	1,242	–	–	2	–	–	–	2	–	–	–	1	–
269	Wenham	1,232	–	–	4	–	–	–	4	–	1	–	2	–
270	Topsfield	1,170	–	–	–	–	–	–	1	–	7	–	–	–
271	Berkley	1,130	–	–	–	–	–	–	–	–	–	–	–	–
272	Granby	1,108	–	–	–	–	–	–	–	–	–	–	–	–
273	Sunderland	1,077	–	–	6	–	–	–	–	–	–	–	–	–
274	Hampden	1,064	–	–	–	–	–	–	–	–	–	–	–	–
275	Berlin	1,056	–	–	1	–	–	–	–	–	–	–	–	–
276	West Stockbridge	1,055	–	–	1	–	–	–	–	–	–	–	1	–
277	Ashby	1,031	–	–	16	–	–	–	–	–	–	–	–	–
278	Sherborn	1,030	–	–	–	–	–	–	1	–	–	–	–	–
279	East Brookfield	1,027	–	–	1	–	–	–	5	–	1	–	–	–
280	Brimfield	1,027	–	–	–	–	–	–	–	–	1	–	1	–
281	Hubbardston	1,023	–	–	–	–	–	–	–	–	–	–	–	

Dangerous to the Public Health, 1941 — Continued

Lobar Pneumonia		Measles		Menin. Meningitis		Mumps		Ophthalmia Neonatorum		Scarlet Fever		Syphilis		Tuberculosis, Pulmonary		Tuberculosis, Other Forms		Typhoid Fever		Whooping Cough		
Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Line No.
3	1	–	–	–	–	1	–	–	–	3	–	3	–	1	1	–	–	–	–	–	–	207
4	–	–	–	–	–	14	–	–	–	–	–	4	–	1	–	–	–	–	–	2	–	208
3	–	40	–	–	–	4	–	–	–	13	–	4	–	1	1	–	–	–	–	15	–	209
–	1	3	–	1	–	–	–	–	–	9	–	1	–	1	1	–	–	–	–	–	–	210
1	–	–	–	–	1	–	–	–	–	1	–	1	–	–	–	–	–	–	–	–	–	211
–	1	36	–	–	–	–	–	–	–	3	–	2	–	2	9	–	–	–	–	7	–	212
–	–	–	–	–	–	–	–	–	–	7	–	–	–	–	–	–	–	–	–	–	–	213
–	–	34	–	1	1	13	–	–	–	–	–	1	–	2	–	–	–	–	–	6	–	214
2	–	2	–	–	–	37	–	–	–	4	–	2	–	–	–	–	–	–	–	1	–	215
1	–	14	–	–	–	35	–	–	–	2	–	1	–	2	–	–	–	–	–	16	–	216
3	–	–	–	–	–	11	–	1	–	2	–	–	–	1	–	1	1	–	–	26	–	217
5	2	–	–	–	–	–	–	–	–	–	–	5	–	1	–	–	–	–	–	–	–	218
–	2	63	–	–	–	1	–	–	–	5	–	3	1	–	1	1	–	1	–	–	–	219
–	–	–	–	–	–	–	–	–	–	–	–	4	–	1	1	1	1	–	–	–	–	220
–	–	13	–	–	–	2	–	–	–	3	–	–	–	–	–	–	–	–	–	–	–	221
–	1	–	–	–	–	1	–	–	–	2	–	–	–	–	–	–	–	–	–	–	–	222
–	–	2	–	–	–	–	–	–	–	1	–	2	–	–	–	–	–	–	–	–	–	223
1	–	–	–	–	–	–	–	–	–	1	–	–	1	–	1	–	–	–	–	2	–	224
–	1	2	–	–	–	–	–	–	–	4	–	–	–	–	–	–	–	–	–	–	–	225
–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	2	–	–	–	–	–	–	226
–	–	–	–	–	–	–	–	–	–	–	–	1	1	–	1	–	–	–	–	–	–	227
1	–	1	–	–	–	–	–	–	–	–	–	–	–	5	–	–	–	–	–	41	–	228
2	1	2	–	–	–	4	–	–	–	4	–	–	–	–	–	–	–	–	–	36	–	229
–	–	7	–	–	–	9	–	–	–	–	–	–	1	2	2	1	1	–	–	1	–	230
1	2	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	231
–	–	4	–	–	–	1	–	–	–	7	–	2	–	–	–	–	–	–	–	–	–	232
4	1	33	–	–	–	6	–	–	–	14	–	1	–	2	–	–	–	–	–	14	–	233
–	–	4	–	–	–	–	–	–	–	–	–	1	1	1	–	–	–	–	–	–	–	234
–	–	2	–	–	–	–	–	–	–	5	–	–	–	–	–	–	–	–	–	27	–	235
–	1	–	–	–	–	–	–	–	–	1	–	–	1	–	1	–	–	–	–	6	–	236
–	–	–	–	–	–	–	–	–	–	–	–	1	–	1	–	–	–	–	–	3	–	237
2	–	43	–	–	–	1	–	–	–	–	–	–	–	1	1	–	–	–	–	2	–	238
–	–	2	–	–	–	1	–	–	–	1	–	–	–	1	–	–	1	–	–	–	–	239
–	–	–	–	–	–	–	–	–	–	–	–	1	–	1	–	–	–	–	–	–	–	240
–	–	–	–	–	–	–	–	–	–	–	–	5	–	–	–	–	1	–	–	–	–	241
–	–	1	–	–	–	–	–	–	–	–	–	2	–	–	–	–	–	–	–	–	–	242
3	1	1	–	–	–	6	–	–	–	–	–	3	1	1	–	–	–	–	–	2	–	243
–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	244
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	245
–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	246
–	–	1	–	–	–	1	–	–	–	2	–	–	–	–	1	–	–	–	–	–	–	247
–	–	–	–	–	–	1	–	–	–	–	–	2	–	–	–	–	–	–	–	–	–	248
–	–	21	–	–	–	1	–	–	–	2	–	–	–	1	1	–	–	–	–	3	–	249
–	–	4	–	–	–	–	–	–	–	4	–	7	–	–	1	–	–	1	–	2	–	250
–	–	–	–	–	–	–	–	–	–	–	–	2	1	–	1	–	–	–	–	–	–	251
–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	8	–	252
1	–	3	–	–	–	74	–	–	–	1	–	1	–	–	–	–	–	–	–	15	–	253
1	–	8	–	–	–	5	–	–	–	5	–	2	–	–	–	–	–	–	–	8	–	254
–	–	–	–	–	–	–	–	–	–	–	–	3	–	1	–	–	–	–	–	–	–	255
2	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	256
3	1	–	–	–	–	–	–	–	–	–	–	4	–	1	1	–	–	–	–	2	–	257
1	–	1	–	–	–	–	–	–	–	1	–	–	–	1	–	–	–	–	–	–	–	258
–	1	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	259
–	–	–	–	–	–	–	–	–	–	–	–	1	–	1	–	–	–	–	–	–	–	260
–	–	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	261
–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	262
–	–	–	–	–	–	–	–	–	–	–	–	1	–	1	–	–	–	–	–	–	–	263
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	264
3	–	1	–	–	–	–	–	–	–	1	–	–	–	1	–	–	–	–	–	2	–	265
–	–	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	4	–	266
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	267
–	1	–	–	–	–	–	–	–	–	1	–	5	–	–	–	–	–	–	–	–	–	268
–	–	1	–	–	–	13	–	–	–	1	–	–	–	–	–	1	–	–	–	4	–	269
2	–	1	–	–	–	–	–	–	–	8	–	1	–	–	–	–	–	–	–	1	–	270
–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	271
–	–	–	–	–	–	–	–	–	–	–	–	2	–	–	1	–	–	–	–	–	–	272
–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	273
–	–	–	–	–	–	1	–	–	–	2	–	1	–	–	–	–	–	–	–	–	–	274
1	–	21	–	–	–	2	–	–	–	–	–	–	–	–	–	–	–	–	–	12	–	275
1	–	–	–	–	–	–	–	–	–	–	–	1	–	1	–	–	–	–	–	13	–	276
–	–	–	–	–	–	2	–	–	–	5	–	1	–	–	–	–	–	–	–	2	–	277
2	2	–	–	–	–	–	–	–	–	3	–	1	–	–	–	–	–	–	–	–	–	278
–	–	3	–	–	–	1	–	–	–	–	–	2	–	1	–	–	–	–	–	–	–	279
–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	280
–	–	–	–	1	–	–	–	–	–	–	–	1	–	1	1	–	–	–	–	–	–	281

Line No.	Cities and Towns in Order of Population	Population Estimated as of July 1, 1941	Anterior Poliomyelitis		Chicken Pox		Diphtheria		Dog Bite		German Measles		Gonorrhea	
			Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
	Towns under 1,000	*34,559*	–	–	*57*	–	–	–	*33*	–	*18*	–	*13*	–
282	New Marlborough	967	–	–	3	–	–	–	1	–	–	–	–	–
283	Whately	961	–	–	1	–	–	–	–	–	–	–	–	–
284	Bernardston	961	–	–	5	–	–	–	1	–	–	–	–	–
285	Petersham	955	–	–	1	–	–	–	–	–	–	–	–	–
286	Southampton	951	–	–	–	–	–	–	2	–	–	–	1	–
287	Conway	949	–	–	2	–	–	–	–	–	–	–	–	–
288	Gill	925	–	–	3	–	–	–	–	–	9	–	–	–
289	Wellfleet	897	–	–	–	–	–	–	3	–	–	–	1	–
290	Halifax	883	–	–	–	–	–	–	1	–	–	–	–	–
291	Ashfield	873	–	–	4	–	–	–	–	–	–	–	–	–
292	Brewster	833	–	–	–	–	–	–	1	–	–	–	–	–
293	Paxton	804	–	–	–	–	–	–	–	–	–	–	–	–
294	Royalston	801	–	–	–	–	–	–	–	–	–	–	–	–
295	Boxford	793	–	–	11	–	–	–	8	–	5	–	–	–
296	Charlemont	787	–	–	–	–	–	–	–	–	–	–	4	–
297	Bolton	776	–	–	2	–	–	–	–	–	–	–	–	–
298	Carlisle	768	–	–	–	–	–	–	–	–	–	–	1	–
299	Princeton	713	–	–	–	–	–	–	–	–	–	–	–	–
300	Becket	690	–	–	–	–	–	–	–	–	–	–	–	–
301	Leverett	689	–	–	1	–	–	–	–	–	–	–	–	–
302	Granville	668	–	–	–	–	–	–	–	–	–	–	–	–
303	Richmond	629	–	–	–	–	–	–	–	–	–	–	2	–
304	Cummington	616	–	–	–	–	–	–	1	–	–	–	–	–
305	Truro	593	–	–	11	–	–	–	–	–	2	–	–	–
306	Eastham	585	–	–	–	–	–	–	1	–	–	–	–	–
307	Pelham	581	–	–	–	–	–	–	–	–	–	–	–	–
308	Plympton	534	–	–	–	–	–	–	–	–	–	–	1	–
309	Phillipston	496	–	–	–	–	–	–	–	–	–	–	–	–
310	Blandford	472	–	–	–	–	–	–	–	–	–	–	–	–
311	Worthington	470	–	–	–	–	–	–	–	–	–	–	–	–
312	Egremont	458	–	–	7	–	–	–	1	–	–	–	1	–
313	Dunstable	454	–	–	1	–	–	–	–	–	1	–	–	–
314	Warwick	452	–	–	–	–	–	–	–	–	–	–	–	–
315	Mashpee	445	–	–	–	–	–	–	–	–	–	–	1	–
316	New Braintree	442	–	–	–	–	–	–	–	–	–	–	1	–
317	Florida	434	–	–	–	–	–	–	–	–	–	–	–	–
318	Chesterfield	422	–	–	–	–	–	–	2	–	–	–	–	–
319	Sandisfield	421	–	–	1	–	–	–	–	–	–	–	–	–
320	Oakham	415	–	–	–	–	–	–	–	–	–	–	–	–
321	Westhampton	405	–	–	–	–	–	–	–	–	–	–	–	–
322	Wendell	394	–	–	–	–	–	–	–	–	–	–	–	–
323	Boxborough	383	–	–	–	–	–	–	2	–	–	–	–	–
324	Wales	367	–	–	–	–	–	–	–	–	–	–	–	–
325	Otis	364	–	–	1	–	–	–	8	–	–	–	–	–
326	Heath	361	–	–	–	–	–	–	–	–	–	–	–	–
327	New Salem	351	–	–	–	–	–	–	–	–	–	–	–	–
328	Hancock	330	–	–	–	–	–	–	–	–	–	–	–	–
329	Monterey	320	–	–	–	–	–	–	1	–	–	–	–	–
330	Windsor	307	–	–	–	–	–	–	–	–	–	–	–	–
331	Savoy	300	–	–	–	–	–	–	–	–	–	–	–	–
332	Washington	272	–	–	–	–	–	–	–	–	–	–	–	–
333	Leyden	260	–	–	–	–	–	–	–	–	–	–	–	–
334	West Tisbury	260	–	–	–	–	–	–	–	–	–	–	–	–
335	Plainfield	259	–	–	–	–	–	–	–	–	–	–	–	–
336	Holland	259	–	–	–	–	–	–	–	–	–	–	–	–
337	Hawley	251	–	–	–	–	–	–	–	–	–	–	–	–
338	Goshen	236	–	–	–	–	–	–	–	–	–	–	–	–
339	Rowe	226	–	–	–	–	–	–	–	–	–	–	–	–
340	Chilmark	224	–	–	–	–	–	–	–	–	1	–	–	–
341	Tyringham	210	–	–	–	–	–	–	–	–	–	–	–	–
342	Monroe	206	–	–	–	–	–	–	–	–	–	–	–	–
343	Alford	201	–	–	–	–	–	–	–	–	–	–	–	–
344	Middlefield	201	–	–	–	–	–	–	–	–	–	–	–	–
345	Shutesbury	188	–	–	–	–	–	–	–	–	–	–	–	–
346	Montgomery	181	–	–	3	–	–	–	–	–	–	–	–	–
347	Peru	145	–	–	–	–	–	–	–	–	–	–	–	–
348	Gosnold	137	–	–	–	–	–	–	–	–	–	–	–	–
349	Tolland	129	–	–	–	–	–	–	–	–	–	–	–	–
350	Gay Head	124	–	–	–	–	–	–	–	–	–	–	–	–
351	New Ashford	88	–	–	–	–	–	–	–	–	–	–	–	–
352	Mt. Washington	57	–	–	–	–	–	–	–	–	–	–	–	–
353	Tewksbury State Hospital		–	–	39	–	–	–	–	–	–	–	–	–

Dangerous to the Public Health, 1941 — Continued

Lobar Pneumonia		Measles		Menin. Meningitis		Mumps		Ophthalmia Neonatorium		Scarlet Fever		Syphilis		Tuberculosis, Pulmonary		Tuberculosis, Other Forms		Typhoid Fever		Whooping Cough		
Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Line No.
8	–	*87*	–	–	–	*23*	–	–	–	*36*	–	*24*	–	*6*	*8*	*1*	–	–	–	*7*	–	
–	–	–	–	–	–	–	–	–	–	–	–	2	–	–	–	–	–	–	–	–	–	282
–	–	3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	283
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	284
–	–	8	–	–	–	–	–	–	–	3	–	–	–	1	–	–	–	–	–	–	–	285
1	–	1	–	–	–	–	–	–	–	2	–	–	–	–	–	–	–	–	–	–	–	286
1	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	287
–	–	–	–	–	–	–	–	–	–	3	–	–	–	–	–	–	–	–	–	–	–	288
–	–	–	–	–	–	1	–	–	–	9	–	2	–	1	–	–	–	–	–	1	–	289
–	–	–	–	–	–	1	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	290
2	–	2	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	291
–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	292
–	–	4	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	293
–	2	2	–	–	–	–	–	–	–	1	–	2	–	–	–	–	–	–	–	–	–	294
–	–	–	–	–	–	–	–	–	–	3	–	3	–	1	–	–	–	–	–	–	–	295
–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	296
–	–	–	–	–	–	1	–	–	–	4	–	–	–	–	–	–	–	–	–	–	–	297
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	298
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	299
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	300
1	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	301
–	–	–	–	–	–	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	302
–	–	9	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	303
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2	–	304
–	–	2	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	305
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	306
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	307
–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	2	–	–	–	–	–	–	308
–	–	2	–	–	–	–	–	–	–	2	–	–	–	–	–	–	–	–	–	–	–	309
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	310
–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	311
–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	312
–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	313
–	–	2	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	314
–	–	–	–	–	–	–	–	–	–	–	–	3	–	2	–	–	–	–	–	–	–	315
–	–	3	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	316
–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	317
1	–	8	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	318
–	1	–	–	–	–	1	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	319
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	320
–	–	4	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	321
–	–	1	–	–	–	2	–	–	–	3	–	–	–	–	–	–	–	–	–	–	–	322
–	–	32	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	323
1	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	324
–	–	–	–	–	–	10	–	–	–	–	–	1	–	–	–	–	–	–	–	3	–	325
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	326
–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	327
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	328
–	–	2	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	329
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	330
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	331
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	332
1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	333
–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	1	–	–	–	–	–	–	334
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	335
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	336
–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	337
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	338
–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	339
–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	340
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	341
–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	342
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	343
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	344
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	345
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	346
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	347
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	348
–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	349
–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	350
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	351
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	352
25	–	–	–	–	–	–	–	1	–	–	–	–	–	56	–	1	–	–	–	–	–	353

Line No.	Cities and Towns in Order of Population	Population Estimated as of July 1, 1941	Anterior Poliomyelitis		Chicken Pox		Diphtheria		Dog Bite		German Measles		Gonorrhea	
			Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
354	Camp Edwards		–	–	–	–	–	–	1	–	227	–	116	–
355	Fort Banks		–	–	1	–	–	–	–	–	12	–	64	–
356	Fort Devens		1	–	3	–	–	–	–	–	89	–	392	–
357	Fort Rodman		–	–	–	–	–	–	–	–	–	–	3	–
358	Gallups Island		–	–	–	–	–	–	–	–	–	–	1	–
359	Navy Yard		1	–	–	–	–	–	–	–	1	–	16	–
360	U. S. Marine Hospital, Boston		–	–	–	–	–	–	–	–	–	–	24	–
361	U. S. Marine Hospital, Tisbury		–	–	–	–	–	–	–	–	–	–	1	–
362	U. S. Naval Hospital, Chelsa		–	–	–	–	–	–	–	–	–	–	65	–
363	Westover Field		–	–	–	–	–	–	–	–	8	–	24	–

Dangerous to the Public Health, 1941 — Concluded.

Lobar Pneumonia		Measles		Menin. Meningitis		Mumps		Ophthalmia Neonatorum		Scarlet Fever		Syphilis		Tuberculosis, Pulmonary		Tuberculosis, Other Forms		Typhoid Fever		Whooping Cough		
Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Line No.
51	–	27	–	8	–	12	–	–	–	7	–	11	–	–	–	–	–	–	–	–	–	354
–	–	6	–	–	–	–	–	–	–	16	–	4	–	–	–	–	–	–	–	1	–	355
–	–	131	–	2	–	15	–	–	–	71	–	46	–	–	–	–	–	–	–	–	–	356
–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	357
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	358
–	–	1	–	–	–	2	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	359
–	–	–	–	–	–	–	–	–	–	–	–	18	–	–	–	–	–	–	–	–	–	360
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	361
–	–	–	–	–	–	–	–	–	–	–	–	13	–	–	–	–	–	–	–	–	–	362
–	–	3	–	–	–	4	–	–	–	–	–	3	–	–	–	–	–	–	–	–	–	363

In addition to the above, there occurred 4 cases of **actinomycosis** with 2 deaths:

	Cases	Deaths
Boston	1	–
Chicopee	1	–
Malden	1	–
Reading	1	1
Southbridge	–	1

7 cases of **anthrax** with 1 death:

Holyoke	1	–
Lynn	1	–
Malden	1	–
Peabody	2	–
Springfield	1	–
West Boylston	1	1

4 cases of **amebic dysentery**:

Boston	2	–
Fitchburg	1	–
Worcester	1	–

303 cases of **bacillary dysentery** with 6 deaths:

Adams	1	–
Arlington	2	–
Ayer	16	–
Belmont	4	–
Boston	10	–
Brockton	1	1
Cambridge	2	–
Danvers	19	1
Dracut	2	–
Dunstable	91	–
Easthampton	3	–
Fairhaven	1	–
Fall River	3	–
Framingham	1	–
Holliston	4	–
Ipswich	10	–
Lawrence	1	1
Lowell	9	–
Lynn	13	–
Medford	1	–
Melrose	9	–
Northampton	2	–
Peabody	1	–
Revere	–	1
Russell	1	–
Salem	1	–
Seekonk	–	1
Southborough	1	–
Springfield	1	–
Stoneham	1	–
Waltham	18	–
Watertown	2	–
Winchester	1	–
Worcester	70	1
Wrentham	1	–

21 cases of **encephalitis infectious**, with 13 deaths:

Agawam	1	–
Attleboro	1	–
Beverly	–	1
Cambridge	1	–
Danvers	1	–
Dedham	1	–
Fall River	2	1
Gardner	–	1
Greenfield	–	1
Hadley	–	1
Haverhill	–	1
Holyoke	–	1
Lawrence	–	1
Lowell	1	–
Lynn	1	–
Malden	–	1
Middleborough	1	–
Milton	–	1
New Bedford	1	1
Scituate	1	1
Springfield	2	–
Sterling	1	–
Taunton	1	–
Waltham	1	–
Watertown	1	–
Westford	1	1
Winthrop	1	–
Worcester	1	–

10 cases of **malaria** with 1 death:

Boston	1	1
Fort Banks	1	–
Foxboro	6[1]	–
Haverhill	1	–
Winthrop	1	–

14 cases of **meningitis, Pfeiffer bacillus** with 21 deaths:

	Cases	Deaths
Arlington	1	–
Attleboro	1	–
Boston	–	4
Brockton	1	–
Chicopee	1	1
Dedham	–	1
Everett	–	1
Fitchburg	–	1
Framingham	1	1
Gloucester	–	1
Lancaster	1	–
Maynard	–	1
Methuen	–	1
Newbury	1	–
Northampton	1	–
Orange	–	1
Palmer	1	–
Revere	–	1
Salem	2	1
Scituate	–	1
Springfield	1	1
Waltham	1	–
Weymouth	–	1
Wilmington	–	1
Woburn	–	1
Worcester	1	1

17 cases of **meningitis, pneumococcal:**

Arlington	1	–
Boston	1	–
Braintree	1	–
Brockton	1	–
Cambridge	1	–
Fort Devens	1	–
Gloucester	3	–
Haverhill	2	–
Lawrence	1	–
Lowell	1	–
Norwell	1	–
Quincy	1	–
Weymouth	1	–
Worcester	1	–

5 cases of **meningitis**, other forms:

Boston	1	–
Chicopee	1	–
East Bridgewater	1	–
Taunton	1	–
Winthrop	1	–

77 cases of **paratyphoid fever** and all other **Salmonella** infections with 1 death:

Adams	2	–
Belmont	1	–
Beverly	3	–
Boston	7	1
Brookline	1	–
Cambridge	3	–
Charlton	1	–
Chelmsford	1	–
Everett	1	–
Fort Banks	1	–
Fort Devens	1	–
Foxborough	1	–
Haverhill	2	–
Ipswich	1	–
Lawrence	1	–
Lexington	10	–
Lowell	2	–
Lynn	2	–
Malden	14	–
Marblehead	1	–
Medford	3	–
Northampton	1	–
Norwood	1	–
Peabody	2	–
Salem	6	–
Saugus	1	–
Tewksbury State Hospital	1	–
Waltham	1	–
Westwood	2	–
Winchester	1	–
Worcester	2	–

18 cases of **pellagra** with 7 deaths:

Adams	–	1
Boston	10	1
Fall River	1	–
Grafton	3	–
Newton	–	1
North Adams	–	1
Peabody	1	–
Quincy	1	–
Wakefield	1	1

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[1] Therapeutic.

	Cases	Deaths
West Brookfield	–	1
Winchendon	1	1
171 cases of **septic sore throat** with 22 deaths:		
Amesbury	3	–
Andover	3	–
Arlington	1	–
Ashland	1	–
Bernardston	3	–
Beverly	9	1
Boston	61	4
Boxford	1	–
Brockton	2	–
Cambridge	4	–
Chelsea	1	–
Chicopee	1	2
Concord	2	–
Easton	1	–
Everett	1	–
Fall River	20	1
Fort Banks	1	–
Fitchburg	–	1
Framingham	1	–
Gill	1	–
Greenfield	2	1
Hanson	2	–
Hingham	1	–
Holyoke	1	–
Ipswich	–	1
Lexington	1	–
Lowell	1	–
Lynn	4	–
Malden	2	1
Marlborough	–	2
Medford	8	–
Merrimac	4	–
Milford	–	1
Millbury	1	–
Milton	2	–
Monson	1	–
New Braintree	1	–
Newton	2	2
Norfolk	1	–
Oxford	2	–
Peabody	1	–
Plymouth	1	–
Revere	2	–
Salisbury	1	1
Scituate	1	–
Somerville	1	2
Springfield	1	1
Waltham	3	–
West Springfield	1	–
Weymouth	1	–
Williamstown	2	–
Winchester	1	–
Worcester	1	–
Wrentham	1	–
Yarmouth	–	1
19 cases of **tetanus** with 5 deaths:		
Attleboro	1	1
Boston	2	1
Brockton	1	–
Cambridge	1	–
Concord	1	–
Dudley	1	–
Hingham	1	–
Lowell	–	1
Methuen	1	–
Middleborough	1	1
New Bedford	2	1
Quincy	2	–
Saugus	1	–
Swampscott	1	–
Wakefield	1	–
Woburn	1	–
Worcester	1	–
24 cases of **trachoma**:		
Arlington	1	–
Boston	7	–
Burlington	1	–
Cambridge	1	–
Dedham	1	–
Everett	1	–
Fall River	1	–
Haverhill	1	–
Lynn	2	–
Milford	1	–
Natick	1	–
New Bedford	2	–
Peabody	1	–
Springfield	1	–
Worcester	2	–

50 cases of **trichinosis**:

	Cases	Deaths
Attleboro	6	–
Boston	10	–
Camp Edwards	17	–
Chelsea	2	–
Everett	1	–
Fall River	1	–
Framingham	4	–
Gloucester	1	–
Lawrence	1	–
Medford	2	–
Middleborough	1	–
Southbridge	2	–
Wakefield	1	–
Worcester	1	–
184 cases of **tuberculosis, hilum**:		
Boston	160	–
Brookline	1	–
Cambridge	1	–
Framingham	1	–
Haverhill	2	–
Lawrence	2	–
Lexington	1	–
Lowell	2	–
Malden	2	–
New Bedford	2	–
Quincy	3	–
Salem	1	–
Springfield	1	–
Wakefield	2	–
Watertown	1	–
Westfield	2	–
1 case of **tularemia**:		
Lawrence	1	–
2 cases of **typhus fever**:		
Chelmsford	1	–
Northampton	1	–
86 cases of **undulant fever** with 2 deaths:		
Acton	1	–
Adams	2	–
Amherst	1	–
Arlington	1	–
Athol	1	–
Boston	2	1
Bridgewater	1	–
Brockton	2	–
Brookfield	1	–
Carver	1	–
Deerfield	1	–
Falmouth	1	1
Franklin	1	–
Gloucester	2	–
Great Barrington	2	–
Haverhill	1	–
Hopkinton	1	–
Hudson	1	–
Leominster	16	–
Littleton	1	–
Lowell	2	–
Medford	1	–
Milford	1	–
Montague	2	–
Newburyport	1	–
Newton	1	–
Norfolk	1	–
North Adams	2	–
North Brookfield	1	–
Northampton	1	–
Northbridge	1	–
Orange	1	–
Palmer	1	–
Pittsfield	2	–
Plymouth	1	–
Reading	1	–
Royalston	1	–
Sheffield	1	–
Shelburne	2	–
Somerset	1	–
Somerville	1	–
Stockbridge	1	–
Templeton	1	–
Uxbridge	1	–
Walpole	1	–
Warren	1	–
Wayland	1	–
Webster	2	–
Wellesley	1	–
West Brookfield	2	–
Westborough	1	–
Westford	2	–
Whitman	1	–
Worcester	5	–

THE DIVISION OF FOOD AND DRUGS

Hermann C. Lythgoe, *Director*

The Food and Drug Division during the year 1941 has been engaged in the usual routine work relative to the enforcement of the laws pertaining to the sale of milk, foods and drugs; the slaughtering laws; the cold storage laws; the bakery laws; the frozen dessert laws; the laws pertaining to the pasteurization of milk; the laws pertaining to the bottling of carbonated nonalcoholic beverages; certain phases of the narcotic law; the law pertaining to the sale of wood alcohol; the laws pertaining to the sale of articles of bedding and upholstered furniture; and examination of liquors, chemicals, etc. for Police Departments.

There has been a reduction in the number of samples of improperly pasteurized milk and a great increase in the number of samples of pasteurized milk with high bacteria counts. This has been traced largely to the substitution of dirty milking machines for cream and milk because of the difficulty in securing help.

There has been a great increase in the sale of decomposed meats, particularly hamburg steak, sausage, and sausage meat. Violations pertaining to the sale of adulterated olive oil, while many, show a reduction over recent years. Violations of the sanitary food law show an increase due to difficulty in securing help. There has also been an increase in violations of the law pertaining to articles of bedding and upholstered furniture. The actual number of prosecutions was slightly less than in 1940.

Table 1.—*Prosecutions for Violations of the Food and Drug Laws*

For Sale of Milk not of Good Standard Quality

Name	Address	Court	Date	Result
Clover Luck Dairy, Inc.	Newton	Newton	Oct. 9, 1941	Conviction[1]
Green Parrott, Inc.	North Cambridge	Cambridge	Aug. 22, 1941	Conviction

For Sale of Milk from Which a Portion of the Cream Had Been Removed

Fenway Farms Dairy, Inc.	East Longmeadow	Springfield	May 9, 1941	Conviction
Smith, William Henry	Great Barrington	Great Barrington	June 7, 1941	Conviction

For Sale of Milk Containing Added Water

Clark, Joseph W.	West Brookfield	Brookfield	Mar. 14, 1941	Conviction
Cronin, William	Methuen	Methuen.	Oct. 10, 1941	Conviction[2]
Hagopian, Kapreal	Marlborough	Marlborough	Jan. 17, 1941	Conviction
Hood & Sons, H. P., Inc.	Newburyport	Newburyport	Jan. 27, 1941	Conviction[2]
Jackson, Mrs. Emma N.	Berkley	Taunton	Apr. 17, 1941	Conviction
Medeiros, Joseph	Taunton	Taunton	Apr. 17, 1941	Conviction
Mickewicz, Anthony	North Wilmington	Woburn	July 10, 1941	Conviction
Noel, Felix	Granby	Northampton	Feb. 13, 1941	Conviction
Patch, Frank G.	Wilmington	Woburn	July 10, 1941	Conviction[1]
Patch, Frank G.	Wilmington	Woburn	July 10, 1941	Conviction
Simard, John D.	Pelham	Northampton	July 18, 1941	Conviction
Tumidajewicz, Jr., Joseph	Willimansett	Chicopee	Apr. 28, 1941	Conviction
Whitaker, Gowen[3]	Chester	Westfield	Apr. 17, 1941	Conviction

Representing Unpasteurized Milk as Pasteurized

Angelo, Antone	New Bedford	New Bedford	Feb. 28, 1941	Discharged
Bean, Charles A.	Sherborn	Natick	May 2, 1941	Conviction
Bellerose, Rosaire	Charlton	Southbridge	Feb. 14, 1941	Conviction
Choiniere, Arthur[4]	Webster	Webster	Sept. 30, 1941	Conviction
Cronin, Joseph	Methuen	Methuen	Oct. 10, 1941	Conviction[2]
Cronin, William	Methuen	Methuen	Oct. 10, 1941	Conviction[2]
Dolinski, Michael	Westfield	Westfield	Aug. 7, 1941	Conviction
New Bedford Creamery, Inc.	New Bedford	New Bedford	Feb. 28, 1941	Discharged
Oaks Farm, Inc.	Cohasset	Quincy	Oct. 1, 1941	Conviction
Reynolds, Charles H.	Ludlow	Springfield	May 9, 1941	Conviction[2]
Robinson, James A.	Waltham	Waltham	Feb. 13, 1941	Dismissed
Souza, Manuel	Dartmouth	New Bedford	June 20, 1941	Conviction

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[1] Guilty, $50 fine—suspended.
[2] Appealed.
[3] Two cases.
[4] A cream sample.

For Violation of Pasteurization Law and Regulations

NAME	ADDRESS	COURT	DATE	RESULT
Harnisch, Ernest	Methuen	Lawrence	Jan. 13, 1941	Conviction[1]
Harper, David	Lancaster	Clinton	Aug. 19, 1941	Conviction
Hood & Sons, H. P., Inc.[2]	Charlestown	Charlestown	May 13, 1941	Conviction
Lanzillo, Frank	Wakefield	Malden	Feb. 26, 1941	Conviction
Pocius, Gus	Middleborough	Middleborough	Jan. 14, 1941	Conviction
Slosek, John	Ludlow	Springfield	May 16, 1941	Conviction
Slosek, Thomas	Ludlow	Springfield	May 16, 1941	Dismissed
Velantzas, Anastos	Lowell	Lowell	Jan. 20, 1941	Conviction
Velozo, John	Somerset	Fall River	Feb. 25, 1941	Conviction

For Violation of the Milk Grading Regulations

Clover Leaf Dairy, Inc.	Southbridge	Southbridge	July 28, 1941	Conviction
Hescock, Harry A.	Westfield	Westfield	July 31, 1941	Conviction
Hood & Sons, H. P., Inc.	Springfield	Springfield	Mar. 7, 1941	Conviction
Kobritz, Nathan	Pittsfield	Pittsfield	July 11, 1941	Conviction
Nelson, Frank	Charlton	Southbridge	July 28, 1941	Conviction
Rhinehart, Miller	Lanesborough	Pittsfield	July 23, 1941	Conviction
Weeks Creamery, Inc.	Chicopee	Chicopee	Apr. 11, 1941	Conviction

For Use of Unclean Utensils in Handling Milk

Miller, Edward J.	Amherst	Northampton	Apr. 30, 1941	Conviction
Munsell, Frank	Hampden	Springfield	Sept. 5, 1941	Conviction

For Sale of Adulterated or Misbranded Foods other than Milk and Milk Products

CLAMS

(Contained Added Water)

Botticelli, Anthony	Revere	Boston	May 6, 1941	Conviction[1]
Dow, George R.	Salisbury	Amesbury	Apr. 30, 1941	Conviction[3]
Savage, Carl	Rowley	Boston	May 6, 1941	Conviction
Stavis, I. W.	Boston	Boston	Sept. 30, 1941	Conviction

HAMBURG STEAK

(Contained Pork in Violation of the Regulations of the Department)

Bernstein, Hyman	Holyoke	Holyoke	Jan. 30, 1941	Conviction

HAMBURG STEAK

(Violation of the Law Relative to Use of Sodium Sulphite in Meat and Meat Products)

Alter, William	Roxbury	Roxbury	June 25, 1941	Conviction
Linchitz, Leonard	Woburn	Woburn	Feb. 12, 1941	Conviction
Marvin Food Co., Inc.	Somerville	Somerville	Nov. 19, 1941	Conviction
Pasquale, Enrico	Waltham	Waltham	Aug. 8, 1941	Conviction
Roover, Albert C.	South Boston	South Boston	Nov. 5, 1941	Conviction

OLIVE OIL

(Contained Edible Oil Other than Olive Oil)

Cimini, Paul	Pittsfield	Pittsfield	Sept. 4, 1941	Conviction
Dearo, Donald	Utica, N. Y.	Springfield	July 22, 1941	Conviction
Dearo, Donald	Utica, N. Y.	Pittsfield	Oct. 20, 1941	Conviction
Del Castello, Mary[4]	Southboro	Westboro	July 23, 1941	Discharged
Gandolfo, John	Boston	Somerville	June 11, 1941	Conviction
La Flatta, Antonio	North Attleborough	Attleboro	Dec. 3, 1940	Conviction
Lalos, Donatos	Southbridge	Southbridge	Nov. 5, 1941	Conviction
Manzi, L. A., Inc.[5]	Worcester	Southbridge	Mar. 21, 1941	Conviction
Mazzarelli & Sons, S., Inc.[4]	Milford	Milford	June 27, 1941	Conviction[1]
Moroni, Fred	Holyoke	Holyoke	July 17, 1941	Conviction
Previte, Dominick	Boston	Cambridge	Apr. 24, 1941	Conviction[1]
Rapallo, Joseph[4]	Medford	Malden	Apr. 29, 1941	Conviction
Teti, Joseph	Utica, N. Y.	Springfield	July 22, 1941	Conviction

OLIVE OIL

(Misbranded Oil)

Colicci, Luciano	Providence, R. I.	Southbridge	Apr. 30, 1941	Conviction
Mazzarelli & Sons, S., Inc.	Milford	Worcester	Sept. 10, 1941	Conviction
Previte, Dominick	Boston	Cambridge	Apr. 24, 1941	Conviction

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[1] Appealed.
[2] Involving 2 cases.
[3] Guilty, $100 fine: suspended and put on probation for 2 years.
[4] Involving 1 case of misbranding.
[5] Involving 3 counts on adulteration; 3 counts on misbranding.

For Sale of Adulterated or Misbranded Foods other than Milk and Milk Products — Continued

SAUSAGE AND SAUSAGE MEAT

(Violation of the Law Relative to Use of Sodium Sulphite in Meat and Meat Products)

NAME	ADDRESS	COURT	DATE	RESULT
Alpert, Jennie	Roxbury	Roxbury	Feb. 28, 1941	Conviction
Big Bear Meat Department, Inc.	Cambridge	Cambridge	Sept. 26, 1941	Conviction
Consumers' Provision Co., Inc.	Worcester	Worcester	Apr. 25, 1941	Conviction
Contas Brothers, J. S., Inc.	Waltham	Waltham	Aug. 8, 1941	Conviction
Fiermont, Charles	Newton	Newton	Jan. 24, 1941	Conviction
Grupposo, Antonio	Natick	Natick	Jan. 14, 1941	Conviction
Pasquale, Enrico	Waltham	Waltham	Aug. 8, 1941	Conviction
Viscosi, Fillameo	Worcester	Worcester	Apr. 25, 1941	Conviction

SAUSAGE AND SAUSAGE MEAT

(Excessive Cereal or Vegetable Substance)

Colonial Provision Co., Inc.[1]	Boston	Boston	Sept. 30, 1941	Conviction
Colonial Provision Co., Inc.[1]	Boston	New Bedford	Nov. 12, 1941	Conviction
Colonial Provision Co., Inc.[1]	Boston	Fall River	Nov. 14, 1941	Conviction
Colonial Provision Co., Inc.[1]	Boston	Taunton	Nov. 21, 1941	Conviction
Morrison, Hugh	Everett	Boston	Mar. 21, 1941	Conviction
Omaha Packing Co., Inc.	Lowell	Fall River	Sept. 11, 1941	Conviction
Omaha Packing Co., Inc.	Boston	Boston	Sept. 30, 1941	Conviction
Omaha Packing Co., Inc.[2]	Lowell	Worcester	Oct. 3, 1941	Conviction
United Sausage Co., Inc.	Lynn	Taunton	Nov. 7, 1941	Conviction

For Sale of Decomposed Food

HAMBURG STEAK

Bernstein, Hyman	Holyoke	Holyoke	Jan. 30, 1941	Conviction
Cafferty, Anthony J.	Boston	Boston	Oct. 10, 1941	Conviction
Economy Grocery Stores Corp.	Hudson	Marlborough	Jan. 17, 1941	Conviction
Grenon, Simon	Marlborough	Marlborough	Jan. 17, 1941	Conviction
Kaplin, Jack	Woburn	Woburn	Feb. 12, 1941	Conviction
Linchitz, Leonard	Woburn	Woburn	Feb. 12, 1941	Conviction
Pasquale, Enrico	Waltham	Waltham	Aug. 8, 1941	Conviction
Shwachman, Philip	Boston	Boston	Aug. 1, 1941	Conviction
Terminal Markets, Inc.	Roxbury	Roxbury	June 9, 1941	Conviction

LAMB PATTIES

Grand Union Co., Inc., The	Pittsfield	Pittsfield	Feb. 5, 1941	Conviction

SAUSAGE AND SAUSAGE MEAT

Alpert, Jennie	Roxbury	Roxbury	Feb. 28, 1941	Conviction
Armour & Co. (2 counts)	Roxbury	Roxbury	Feb. 20, 1941	Discharged
Armour & Co.	Boston	Cambridge	Mar. 11, 1941	Conviction
Atlantic & Pacific Tea Co., The Great	Salem	Salem	Nov. 28, 1941	Conviction
Bellantoni, Joseph	Boston	Roxbury	Oct. 7, 1941	Conviction
Berkson, John	Charlestown	Charlestown	Nov. 21, 1941	Conviction[3]
Big Bear Meat Department, Inc.	Cambridge	Cambridge	Sept. 26, 1941	Conviction
Brockelman Brothers, Inc.[2]	Marlborough	Marlborough	Jan. 17, 1941	Conviction
Brockelman Brothers, Inc.	Marlborough	Marlborough	Oct. 6, 1941	Conviction
Cooper, David	Salem	Salem	Dec. 20, 1940	Conviction
Economy Grocery Stores Corp.	Springfield	Springfield	Jan. 7, 1941	Conviction[3]
Economy Grocery Stores Corp.	Cambridge	Cambridge	Feb. 24, 1941	Discharged
Economy Grocery Stores Corp.	Brockton	Brockton	Nov. 24, 1941	Conviction[3]
Elgart, Myer	Woburn	Woburn	Feb. 12, 1941	Conviction
Elias, James	Norwood	Dedham	Mar. 14, 1941	Discharged
Esaian, Paul	Boston	Boston	Jan. 23, 1941	Conviction
First National Stores, Inc.	Newton	Newton	Feb. 3, 1941	Conviction[3]
Foster, Dave	Charlestown	Charlestown	Nov. 21, 1941	Conviction
Freedman, Joseph	Roxbury	Roxbury	Feb. 28, 1941	Conviction
Goldberg, J.	Boston	Boston	June 11, 1941	Conviction

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[1] Doing business as State Sausage Co.

[2] Involving 2 cases.

[3] Appealed.

For Sale of Decomposed Food — Continued

SAUSAGE AND SAUSAGE MEAT—Concluded

NAME	ADDRESS	COURT	DATE	RESULT
Howes, Newton[1]	Holyoke	Holyoke	Jan. 30, 1941	Conviction
Jaffe, Harold	Pittsfield	Pittsfield	Feb. 5, 1941	Conviction
Jankowski, Konstanty	Norwood	Dedham	Jan. 23, 1941	Conviction
Kelsey's Market, Inc.	Great Barringgton	Great Barrington	Dec. 27, 1940	Conviction
Klys, Antonia	Palmer	Palmer	Mar. 7, 1941	Conviction
Krasnoff, Morris	Cambridge	Cambridge	Nov. 26, 1941	Conviction
Levy, Samuel	Pittsfield	Pittsfield	Feb. 19, 1941	Conviction
L'Heureux, Donat	Salem	Salem	Feb. 5, 1941	Discharged
Linchitz, Leonard	Woburn	Woburn	Feb. 12, 1941	Conviction
Liro, Joseph	Southbridge	Southbridge	Nov. 5, 1941	Conviction
Massachusetts Mohican Co., Inc., The[1]	Springfield	Springfield	Jan. 7, 1941	Conviction
Massachusetts Mohican Co., Inc., The	Salem	Salem	Oct. 16, 1941	Conviction
McKenna, Joseph P.	Stoneham	Woburn	Feb. 4, 1941	Dismissed
McKenna, Thomas E.	Stoneham	Woburn	Feb. 4, 1941	Dismissed
Miller, Louis	Charlestown	Charlestown	Nov. 21, 1941	Conviction
Mohican Market, Inc.	Newton	Newton	Apr. 21, 1941	Conviction
Morino, Ermando	Norwood	Dedham	Mar. 14, 1941	Discharged
Neighborhood Stores, Inc.	Athol	Athol	Dec. 16, 1940	Conviction
Neway Market, Inc.	Chicopee	Chicopee	Jan. 10, 1941	Discharged
New England Market, Inc.	Cambridge	Cambridge	Jan. 22, 1941	Conviction
O'Loughlin, Michael	South Boston	South Boston	Jan. 28, 1941	Conviction
Omer, Richard	Springfield	Springfield	Dec. 20, 1940	Conviction
Quink, Francis	Belchertown	Northampton	Dec. 19, 1940	Conviction
Ritso, William	Norwood	Dedham	Feb. 19, 1941	Conviction
Saletsky, Jack	Boston	Boston	Aug. 7, 1941	Conviction
Solin's Market, Inc.	Chicopee	Chicopee	Jan. 3, 1941	Conviction
Squire Company, John P.	Cambridge	Salem	Nov. 18, 1941	Conviction
St. Amand, Adrian	Holyoke	Holyoke	Feb. 18, 1941	Conviction
Tillman, Herbert	Springfield	Springfield	Jan. 7, 1941	Conviction
Torelli, Emilio	Framingham	Framingham	Feb. 6, 1941	Conviction
Viera, Manuel	Cambridge	Cambridge	Nov. 17, 1941	Conviction
White Star Foods, Inc.	Waltham	Waltham	Aug. 8, 1941	Conviction
Willworth, Frank G.	Boston	Boston	June 1, 1941	Conviction[2]

Using Decomposed Eggs in the Manufacture of Food Products

Vigeant, Louis E.	Southbridge	Southbridge	June 20, 1941	Conviction

For Violation of Sanitary Food Law

Bence Pharmacy, Inc.	Cambridge	Cambridge	June 13, 1941	Conviction
Berger's, Bob, Inc.	Boston	Boston	July 14, 1941	Conviction
Cataldo, Angelo[3]	Boston	Boston	July 9, 1941	Conviction
Cataldo, Angelo.	Boston	Boston	July 9, 1941	Dismissed
Gillispee, John E.	Stoneham	Woburn	Sept. 27, 1941	Conviction
Greylock Confectionery Corp.[3]	Cambridge	Cambridge	June 10, 1941	Conviction
Harvard Grill Garden, Inc.	Cambridge	Cambridge	July 7, 1941	Conviction
Johnson Co., Howard D.	Andover	Lawrence	Aug. 27, 1941	Conviction
Scollo, Pasquale.	North Reading	Woburn	Aug. 29, 1941	Conviction
Scollo, Pasquale.	North Reading	Woburn	Sept. 12, 1941	Conviction
Vigeant, Louis E.	Southbridge	Southbridge	June 20, 1941	Conviction
Waldorf System, Inc.	Cambridge	Cambridge	July 7, 1941	Conviction
Walton Lunch Co.	Boston	Boston	Sept. 26, 1941	–[4]
Wursthaus Restaurant, Inc.	Cambridge	Cambridge	July 7, 1941	Conviction

For Violation of Bakery Laws

Brockton Public Market, Inc.	New Bedford	New Bedford	Oct. 17, 1941	Conviction
Fishman, Harry.	Springfield	Springfield	May 20, 1941	Conviction
Fishman, Harry.	Springfield	Springfield	Sept. 19, 1941	Conviction
Purity Bakeries, Inc.[1]	Springfield	Springfield	Jan. 24, 1941	Conviction
Sternman, John	Springfield	Springfield	May 20, 1941	Dismissed
Sternman, John	Springfield	Springfield	Sept. 19, 1941	Conviction
Waltham Baking Co., The[3]	Waltham	Waltham	June 20, 1941	Conviction

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[1] Two counts.

[2] Appealed.

[3] Involving 2 cases.

[4] Dismissed for want of prosecution.

For Violation of Law and Regulations Relative to the Manufacture and Bottling of Carbonated Nonalcoholic Beverages, Soda Water, Mineral and Spring Water

NAME	ADDRESS	COURT	DATE	RESULT
Chruscial, Jacob	Everett	Malden	Aug. 14, 1941	Conviction
Czerwonka, Walter	Fall River	Fall River	May 1, 1941	Conviction
Davis Co., George A.	Gloucester	Gloucester	May 7, 1941	Conviction
Dobbs Beverage Co.	Leicester	Worcester	July 24, 1941	Conviction
Rozbicki, Stanley	Everett	Malden	Aug. 14, 1941	Dismissed
Thomas Beverage Co.	Malden	Malden	Aug. 26, 1941	Conviction

For Sale of an Adulterated Drug not Conforming to the Requirements of the U. S. Pharmacopoeia

Johnson Wholesale Perfume Co., Inc.	Springfield	Springfield	Jan. 8, 1941	Conviction[1]

For Violation of Law Pertaining to Bedding and Upholstered Furniture

American Upholstering Corp., The	Waterbury, Conn.	Springfield	Feb. 5, 1941	Conviction
Berkshire Upholstered Furniture Co.[2]	Springfield	Worcester	Oct. 3, 1941	Conviction
Boston Dry Goods Mfg. Co.	Boston	Boston	Jan. 7, 1941	Conviction
Boyatzi, Kyriaco	Worcester	Worcester	July 28, 1941	Conviction
Buchman Co., Inc., The L.	Brooklyn, N. Y.	Boston	Jan. 7, 1941	Conviction
Buchman Co., Inc., The L.	Brooklyn, N. Y.	Worcester	Jan. 9, 1941	Conviction
Chuker, Pinkus	Boston	Boston	Jan. 7, 1941	Conviction
Chuker, Pinkus	Boston	Boston	Feb. 13, 1941	Conviction
Comfort Pillow & Feather Co.[2]	Somerville	Boston	Nov. 6, 1941	Conviction
Denholm & McKay Co.	Worcester	Worcester	Jan. 9, 1941	Dismissed
Ehrlich Inc., Charles J.	New Bedford	New Bedford	July 31, 1941	Conviction
Feinberg, William	Chelsea	Boston	Oct. 6, 1941	Conviction
General Mattress Co.	Fall River	Fall River	July 24, 1941	Conviction[1]
Gilchrist Co.	Boston	Boston	Dec. 17, 1940	Conviction
Goodrest Trading Corp.	Springfield	Fitchburg	May 20, 1941	Conviction
Hadley Co., The	Springfield	Springfield	Feb. 5, 1941	Discharged
Hartford Mattress Co., Inc.	Hartford, Conn.	Springfield	July 10, 1941	Conviction
Hutner, Etta	Springfield	Springfield	Feb. 26, 1941	Conviction
Jordan Marsh Co.	Boston	Boston	Dec. 17, 1940	Conviction
Jordan Marsh Co.	Boston	Boston	Jan. 17, 1941	Dismissed
Lavine, Edward I.[3]	New Haven, Conn.	Fall River	Jan. 16, 1941	Conviction
Lincoln Stores, Inc.	Lowell	Lowell	July 21, 1941	Dismissed
Lincoln Stores, Inc.	Fitchburg	Fitchburg	July 22, 1941	Dismissed
Lullaby Products Co.	Carnegie, Pa.	Lowell	July 21, 1941	Conviction
Lullaby Products Co.	Carnegie, Pa.	Fitchburg	July 22, 1941	Conviction
Metropolitan Furniture Co.	Springfield	Springfield	Feb. 5, 1941	Discharged
Moller's Inc.	Cambridge	Cambridge	Dec. 3, 1940	Conviction
New England Dry Goods Co.	Boston	Boston	Jan. 7, 1941	Conviction
New England Furniture Corp.	Pittsfield	Pittsfield	Feb. 27, 1941	Conviction
Reliable Upholstering Corp.	Cambridge	Fall River	Apr. 17, 1941	Discharged
Russell Furniture Co., Inc., Ellis H.	Salem	Salem	Apr. 1, 1941	Conviction[1]
Sears Roebuck & Co.	Pittsfield	Pittsfield	Feb. 27, 1941	Conviction
Scharco Mfg. Co., Inc.	New York, N. Y.	Boston	July 18, 1941	Conviction
Sherer Co., Inc., C. T.	Worcester	Worcester	Jan. 9, 1941	Dismissed
Sherman, Isadore[2]	Chelsea	Boston	Oct. 6, 1941	Conviction
Simon & Sons, Inc., A.	Framingham	Framingham	June 3, 1941	Conviction
Solbro Batting Co., Inc.	Worcester	Gardner	Nov. 27, 1941	Conviction
Stillman Co., John[2]	Springfield	Springfield	Feb. 5, 1941	Discharged
Velsco, Inc.	New York, N. Y.	Southbridge	Oct. 10, 1941	Conviction
Victory Mattress Co., Inc.	Boston	Boston	Nov. 6, 1941	Conviction
White Co., R. H.	Boston	Boston	Jan. 7, 1941	Conviction
Wilson, Fred	Pittsfield	Pittsfield	Feb. 27, 1941	Conviction

Obstruction of an Inspector of the Department of Public Health

Astuti, Frank	Boston	Boston	Apr. 15, 1941	Conviction

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[1] Appealed.
[2] Involving 2 cases.
[3] Doing business as New Haven Quilt Co., New Haven.

Table 2.— *Summary of Milk Statistics*

Number of samples above standard	6,279
Number of samples below	716
Total samples	6,995
Number having more than 15% solids	32
Number having between 14% and 15% solids	270
Number having between 13% and 14% solids	1,907
Number having between 12% and 13% solids	4,070
Number having between 11% and 12% solids	656
Number having between 10% and 11% solids	43
Number having between 9% and 10% solids	14
Number having between 8% and 9% solids	3
Number showing removal of cream	50
Number showing addition of water	76

Table 3.— *Average Composition of Milk Samples*

	Total Samples				Samples Not Declared Adulterated			
	Number of Samples	Total Solids %	Fat %	Solids not Fat %	Number of Samples	Total Solids %	Fat %	Solids not Fat %
December	363	12.92	4.06	8.86	359	12.93	4.07	8.86
January	413	12.76	3.96	8.82	397	12.85	3.99	8.86
February	712	12.87	4.01	8.86	703	12.89	4.02	8.87
March	652	12.84	3.95	8.89	629	12.89	3.97	8.92
April	642	12.82	3.99	8.83	633	12.84	4.00	8.84
May	692	12.73	3.96	8.77	682	12.73	3.97	8.76
June	611	12.59	3.94	8.65	587	12.66	3.97	8.69
July	610	12.50	3.86	8.64	600	12.53	3.88	8.65
August	625	12.57	3.95	8.62	617	12.59	3.97	8.62
September	440	12.71	3.98	8.73	438	12.72	3.99	8.73
October	688	12.84	4.02	8.83	683	12.84	4.03	8.81
November	415	12.82	4.00	8.82	409	12.83	4.00	8.83
Average for year	6,863	12.75	3.97	8.78	6,737	12.77	3.98	8.79

Table 4.— *Summary of Bacteriological Examinations of Milk*

	Samples Examined In Boston	Samples Examined In Westfield
Certified Milk		
Total Samples	84	11
Samples with count below 10,000	83	5
Samples with count above 10,000	1	6
Highest count	17,000	450,000
Lowest count	500	3,000
Geometric Mean	2,450	15,241
Pasteurized Certified Milk		
Total Samples	73	2
Samples with count below 500	71	2
Samples with count above 500	2	–
Highest count	550	200
Lowest count	less than 10	100
Geometric Mean	29	140
Grade A Raw Milk		
Total Samples	8	26
Samples with count below 100,000	7	23
Samples with count above 100,000	1	3
Highest count	620,000	422,000
Lowest count	13,000	2,300
Geometric Mean	9,446	18,160
Grade A Pasteurized Milk		
Total Samples	146	111
Samples with count below 10,000	122	74
Samples with count above 10,000	24	37
Highest count	1,000,000	2,000,000
Lowest count	less than 100	200
Geometric Mean	2,787	4,512
Pasteurized Milk		
Total Samples	2,725	1,135
Samples with count below 25,000	1,755	719
Samples with count below 40,000	1,966	847
Samples with count above 40,000	759	288
Highest count	4,000,000	10,000,000
Lowest count	less than 100	100
Geometric Mean	14,487	14,425

TABLE 4.— *Summary of Bacteriological Examinations of Milk* — Concluded

	Samples Examined	
	In Boston	In Westfield
SPECIAL MILK PASTEURIZED		
Total Samples	6	1
Samples with count below 5,000	6	1
Samples with count above 5,000	–	–
Highest count	4,700	800
Lowest count	350	–
Geometric Mean	1,235	800
RAW MILK TO BE PASTEURIZED		
Total Samples	2,513	833
Samples with count below 100,000	1,635	584
Samples with count below 250,000	2,046	669
Samples with count below 400,000	2,217	704
Samples with count above 400,000	296	129
Highest count	3,800,000	5,200,000
Lowest count	200	1,000
Geometric Mean	42,658	49,934
RAW MILK TO BE PASTEURIZED—GRADE A		
Total Samples	84	3
Samples with count below 100,000	57	3
Samples with count above 100,000	21	–
Highest count	487,000	87,000
Lowest count	300	12,000
Geometric Mean	48,084	31,406
RAW MILK SOLD AS SUCH		
Total Samples	289	474
Samples with count below 100,000	224	332
Samples with count below 400,000	258	429
Samples with count above 400,000	31	45
Highest count	4,200,000	5,900,000
Lowest count	800	1,000
Geometric Mean	50,119	48,944
SPECIAL RAW MILK		
Total Samples	–	7
Samples with count below 50,000	–	6
Samples with count above 50,000	–	1
Highest count	–	230,000
Lowest count	–	3,000
Geometric Mean	–	9,311
CREAM		
Total Samples	276	17
Samples with count below 100,000	195	12
Samples with count above 100,000	81	9
Highest count	4,100,000	5,000,000
Lowest count	100	11,200
Geometric Mean	154,000	300,275

TABLE 5.— *Summary of Analyses of Food Samples*

CHARACTER OF SAMPLE	Not Declared Adulterated or Misbranded	Adulterated or Misbranded	Total
Butter	72	11	83
Cheese	33	13	46
Clams	37	48	85
Cream	304	21	325
Frozen desserts	226	2	228
Flavoring extracts	12	1	13
Fruit juices	11	–	11
Maple products	17	3	20
Meat products:			
Chops	4	1	5
Hamburg steak	140	24	164
Lamb and meat patties	19	4	23
Poultry	2	–	2
Sausage	192	113	305
Miscellaneous*	30	12	42
Olive Oil	85	84	169
Preserved fruits	11	–	11
Soft drinks	6	1	7
Vinegar	58	12	70
Totals	1,259	350	1,609

*Includes individual items totaling less than 5.

TABLE 6.— *Articles Other than Fish Placed in Cold Storage from December 1, 1940, to December 1, 1941*

	Butter (lbs.)	Eggs (Dozens)	Broken-out Eggs (lbs.)	Broilers (lbs.)	Roasters (lbs.)	Fowls (lbs.)	Turkeys (lbs.)	Ducks (lbs.)	Miscellaneous Poultry (lbs.)	Beef (lbs.)	Pork (lbs.)	Lamb and Mutton (lbs.)	Miscellaneous Meats (lbs.)
December	194,101	205,110	827,075	134,376	832,860	476,003	5,068,901	42,871	602,684	961,572	3,298,833	108,885	1,630,561
January	180,600	81,030	610,720	80,873	561,038	422,136	1,285,526	7,707	299,261	707,691	4,584,192	106,327	1,161,736
February	180,389	70,020	740,832	53,044	462,192	278,857	558,480	7,179	113,104	455,355	1,081,765	131,385	680,249
March	261,804	106,590	1,174,060	114,235	298,932	201,419	729,441	41,378	112,568	724,200	1,126,752	219,388	596,704
April	457,754	1,449,030	2,242,374	109,457	270,197	173,867	1,091,610	44,097	307,206	1,106,559	2,045,584	142,438	868,755
May	1,696,116	1,937,370	2,020,965	108,979	376,400	208,319	982,948	281,995	198,522	1,161,184	1,401,409	114,255	926,498
June	3,119,266	1,027,770	1,918,912	121,594	242,638	415,270	594,995	371,246	196,433	1,112,515	2,237,526	27,800	1,085,511
July	2,397,244	630,330	1,893,448	237,551	273,389	355,531	667,503	341,504	172,096	731,154	1,482,354	77,003	1,006,962
August	912,551	288,600	867,930	274,127	242,420	305,626	430,993	180,082	211,228	1,042,659	1,399,046	52,393	1,021,898
September	606,900	254,460	699,636	401,183	683,542	714,560	364,067	116,909	277,068	861,696	2,108,209	44,337	716,098
October	666,292	206,130	594,005	284,914	1,191,473	1,463,728	370,338	105,793	271,004	975,907	1,496,156	139,297	1,199,597
November	317,482	46,290	830,535	162,921	1,223,270	451,770	1,588,482	65,192	490,917	1,024,858	1,909,367	183,355	1,215,738

TABLE 7.— *Articles Other than Fish on Hand in Cold Storage on the First Day of the Month from January 1, 1941, through December 1, 1941*

	Butter (lbs.)	Eggs (Dozens)	Broken-out Eggs (lbs.)	Broilers (lbs.)	Roasters (lbs.)	Fowls (lbs.)	Turkeys (lbs.)	Ducks (lbs.)	Miscellaneous Poultry (lbs.)	Beef (lbs.)	Pork (lbs.)	Lamb and Mutton (lbs.)	Miscellaneous Meats (lbs.)
January	1,124,806	224,580	1,454,174	368,861	2,187,664	1,053,008	6,603,892	639,563	851,157	1,860,727	4,664,094	363,097	2,795,647
February	605,341	92,340	1,103,664	297,722	2,148,433	806,400	7,006,001	436,743	824,176	1,915,150	7,996,660	320,796	2,760,500
March	427,062	65,130	979,874	231,277	1,979,846	705,125	6,045,355	250,536	713,490	1,803,025	8,270,290	308,186	2,537,276
April	408,213	97,350	1,230,799	216,001	1,526,232	384,334	4,895,133	50,162	607,926	1,947,797	8,214,843	364,055	2,195,277
May	550,610	1,457,280	2,448,764	189,678	1,176,300	284,050	3,964,398	21,882	662,309	2,245,055	8,530,869	351,811	2,186,506
June	1,949,465	2,912,310	3,210,849	220,178	971,567	335,200	3,423,935	280,847	687,053	2,408,951	7,017,898	344,893	2,109,066
July	4,413,754	3,537,450	3,930,791	264,352	762,139	519,198	2,717,491	633,936	641,302	2,492,441	6,114,933	263,921	1,886,551
August	6,126,462	3,490,650	4,794,141	286,796	595,905	676,443	1,977,814	948,791	548,819	2,167,968	4,384,257	210,569	1,770,511
September	6,248,956	3,028,110	4,609,969	404,147	500,561	759,919	1,140,259	1,028,240	573,982	2,077,892	3,003,733	163,116	1,358,222
October	6,184,702	2,674,350	4,020,918	698,718	930,509	1,216,452	642,787	1,116,513	733,079	1,980,668	2,397,431	126,576	1,047,249
November	5,868,571	1,664,880	2,943,801	836,357	1,847,113	2,461,784	371,748	1,052,929	782,760	2,063,550	2,016,914	165,049	1,113,527
December	4,998,700	626,640	2,727,271	897,484	2,862,972	2,743,987	1,421,429	858,933	1,104,296	2,381,364	2,735,274	262,944	1,201,067

TABLE 8.— *Fish Placed in Cold Storage from December 15, 1940 to December 15, 1941*

	Bluefish (lbs.)	Butterfish (lbs.)	Catfish (lbs.)	Cod, Hake, Pollock and Haddock (lbs.)	Cod Fillets (lbs.)	Flounders (lbs.)	Haddock Fillets (lbs.)	Halibut (lbs.)	Herring (lbs.)	Mackerel (lbs.)	Pollock Fillets (lbs.)
January	2,946	5,792	2,001	132,235	100,015	191,150	421,455	101,135	40,888	58,846	1,501,255
February	1,673	2,490	1,371	101,283	125,920	109,186	1,318,623	143,969	39,135	91,697	284,776
March	863	1,891	385	52,496	70,360	19,520	1,268,425	183,548	559,860	90,019	14,905
April	719	11,595	1,648	105,441	389,961	42,690	1,830,396	104,652	207,645	89,758	171,240
May	658	1,627	20,450	136,452	897,135	69,470	2,580,359	6,533	186,031	142,241	391,180
June	4,716	29,606	5,069	230,403	802,149	131,130	3,205,407	25,117	275,499	1,363,093	133,775
July	6,482	81,961	3,545	177,000	793,905	113,675	3,766,325	33,031	70,721	357,932	339,725
August	188	62,998	1,416	152,749	531,545	92,745	3,557,790	27,053	73,498	2,092,484	113,896
September	9,502	34,432	2,020	165,328	296,141	249,562	3,584,628	80,679	53,689	1,549,897	156,462
October	11,682	36,755	124	154,850	291,070	209,332	2,348,959	130,414	304,950	2,189,681	562,947
November	1,394	11,718	2,440	284,566	1,311,045	75,070	774,206	242,828	496,095	2,116,679	2,692,475
December	–	3,179	1,420	178,183	421,922	78,520	829,263	253,832	237,780	279,131	3,929,340

	Redfish Fillets (lbs.)	Fall and Silver Salmon (lbs.)	Salmon, all Others (lbs.)	Scup (lbs.)	Shad (lbs.)	Shellfish (lbs.)	Smelts, Eulachon, etc. (lbs.)	Squid (lbs.)	Swordfish lbs.	Whiting (lbs.)	Miscel-laneous Frozen Fish (lbs.)
January	1,464,022	51,688	9,066	1,350	10	84,040	357,098	27,201	165,857	152,485	241,234
February	1,217,139	69,516	21,900	–	57	76,584	566,767	46,335	60,145	188,863	135,229
March	1,489,205	51,436	9,530	–	108	31,643	546,912	41,249	17,804	204,635	72,735
April	2,476,860	42,243	16,258	875	246	35,674	57,705	18,057	18,964	202,050	83,457
May	3,503,678	4,672	2,037	3,050	4,614	166,184	11,919	20,566	64,160	100,798	181,114
June	3,618,392	3,337	3,365	48,169	8,878	255,115	345	442,042	11,969	2,216,632	217,947
July	2,911,252	28,148	64,760	66,174	3,604	282,771	675	122,385	79,665	7,490,637	297,278
August	3,833,532	4,352	1,745	4,393	2,410	423,623	1,625	214,360	377,245	8,748,857	669,153
September	3,777,944	71,201	37,200	8,477	400	182,783	3,240	223,520	198,665	5,130,342	514,347
October	3,460,267	7,890	1,935	415	195	270,094	7,697	179,282	21,734	2,792,197	426,285
November	3,318,408	59,182	80,925	11,199	2,290	463,736	59,502	86,045	52,183	1,408,952	495,255
December	1,755,248	157,620	585	700	31,595	376,076	40,682	49,445	3,468	179,356	220,687

Table 9.— *Fish on Hand in Cold Storage on the Fifteenth Day of the Month from January 15, 1941, through December 15, 1941*

	Bluefish (lbs.)	Butterfish (lbs.)	Catfish (lbs.)	Cod, Hake, Pollock and Haddock (lbs.)	Cod Fillets (lbs.)	Flounders (lbs.)	Haddock Fillets (lbs.)	Halibut (lbs.)	Herring (lbs.)	Mackerel (lbs.)	Pollock Fillets (lbs.)
January	8,598	82,584	1,271	606,754	1,403,653	562,744	2,008,293	101,067	588,515	4,215,365	5,504,408
February	3,453	53,724	1,052	496,520	932,830	425,513	1,619,664	145,521	458,452	2,795,877	4,347,809
March	1,869	16,412	402	321,713	463,088	123,286	1,098,911	99,372	726,290	1,388,970	2,776,196
April	1,642	15,743	1,010	255,982	440,990	52,381	1,231,979	66,483	399,666	374,230	1,615,018
May	1,364	10,514	12,895	177,005	1,033,854	67,188	2,046,552	52,921	468,045	324,409	1,331,326
June	5,273	32,404	8,402	267,517	1,399,418	142,861	3,236,319	60,909	561,769	1,528,422	472,800
July	8,973	106,364	4,625	269,303	1,463,583	180,406	3,945,211	63,428	487,314	1,473,186	383,735
August	7,774	161,275	3,116	253,544	948,191	188,084	4,863,981	63,087	424,092	2,845,168	235,186
September	15,489	180,234	4,270	300,097	576,337	370,697	5,933,054	114,657	394,769	3,652,565	116,016
October	22,358	203,163	3,473	277,311	509,882	368,071	5,901,377	111,220	527,796	5,295,757	217,921
November	18,905	186,856	4,391	436,641	1,361,763	275,691	4,114,541	225,818	829,423	6,296,925	2,042,469
December	15,820	167,251	4,790	458,907	1,476,674	238,317	3,491,415	363,542	798,820	5,402,857	4,810,064

	Redfish Fillets (lbs.)	Fall and Silver Salmon (lbs.)	Salmon, all Others (lbs.)	Scup (lbs.)	Shad (lbs.)	Shellfish (lbs.)	Smelts, Eulachon, etc. (lbs.)	Squid (lbs.)	Swordfish (lbs.)	Whiting (lbs.)	Miscellaneous Frozen Fish (lbs.)
January	918,540	76,375	43,216	18,345	44,211	961,010	461,775	396,437	317,393	4,731,646	1,453,123
February	411,128	63,405	48,403	8,587	42,511	717,697	846,297	273,557	184,103	3,251,862	1,240,033
March	295,303	57,427	33,223	3,738	39,085	384,231	1,189,052	178,818	89,761	1,147,493	965,659
April	926,391	33,202	18,978	3,055	27,753	173,753	970,573	40,113	18,929	145,439	777,501
May	2,236,877	2,655	2,071	3,394	16,827	200,445	816,440	23,739	50,139	99,599	800,621
June	3,598,034	4,864	3,942	51,513	22,579	353,383	757,351	459,469	19,224	1,179,623	769,500
July	3,727,799	15,378	55,478	117,622	25,412	488,599	702,845	530,109	67,549	5,545,201	808,273
August	3,335,612	15,486	50,612	121,924	23,282	640,911	640,830	628,949	424,131	9,633,275	1,150,233
September	3,478,046	82,366	69,382	130,301	21,432	652,616	553,172	633,358	588,215	9,832,313	1,230,550
October	3,224,279	58,272	58,944	121,020	19,134	699,788	446,913	550,207	444,240	8,847,852	1,239,358
November	3,664,937	65,081	116,124	104,386	20,242	971,918	391,196	536,365	333,115	7,185,314	1,391,390
December	3,107,903	158,120	71,489	85,618	45,991	1,213,455	212,741	395,754	212,076	5,344,504	1,249,546

TABLE 10.— *Requests for Extension of Time Granted on Goods in Cold Storage, from December 1, 1940, to December 1, 1941*

(Reason for such extension being that goods were in proper condition for further storage.)

ARTICLE	Weight (Pounds)	Placed in Storage	Extension Granted to	Name
Sugar Yolks	750	Apr. 22, 1940	July 1, 1941	Standard Brands, Inc.
Sugar Yolks	2,430	May 1, 1940	Aug. 1, 1941	Wilson & Co.
Sugar Yolks	3,000	June 25, 1940	Sept. 25, 1941	Wilson & Co.
Voltex	250	May 3, 1940	Aug. 1, 1941	Standard Brands, Inc.
Voltex	38,700	May 23, 1940	Aug. 23, 1941	Standard Brands, Inc.
Voltex	500	May 27, 1941	Aug. 27, 1941	Standard Brands, Inc.
Voltex	2,430	May 31, 1940	Aug. 31, 1941	Standard Brands, Inc.
Voltex	11,370	June 11, 1940	Aug. 21, 1941	Standard Brands, Inc.
Voltex	750	June 10, 1940	Sept. 10, 1941	Standard Brands, Inc.
Egg Whites	750	Apr. 19, 1940	July 19, 1941	Armour & Co.
Egg Whites	1,860	†Apr. 8, 1939	Mar. 22, 1941	The Emulsol Corp.
Egg Whites	1,140	Apr. 1, 1940	July 1, 1941	Standard Brands, Inc.
Egg Whites	450	Apr. 26, 1940	Aug. 1, 1941	Standard Brands, Inc.
Egg Whites	800	May 21, 1940	Aug. 21, 1941	Standard Brands, Inc.
Egg Whites	750	May 29, 1940	Aug. 27, 1941	Standard Brands, Inc.
Egg Whites	35,970	†Apr. 1940	*Dec. 1, 1941	Swift & Co.
Egg Whites	17,820	May, 1940	Aug. 1, 1941	Swift & Co.
Egg Whites	2,730	May, 1940	*Dec. 1, 1941	Swift & Co.
Egg Whites	5,550	May 1, 1940	Aug. 1, 1941	Wilson & Co.
Whole Eggs	3,000	June 3, 1940	Aug. 21, 1941	Standard Brands, Inc.
Whole Eggs	6,060	May 20, 1940	Aug. 1, 1941	Wilson & Co.
Whole Eggs	3,150	May 30, 1940	Sept. 25, 1941	Wilson & Co.
Chicken	7,042	Oct. 10, 1940	Feb. 10, 1942	Benson Bros. Corp.
Geese	677	Dec. 2, 1939	June 1, 1941	Berman & Co., Inc.
Geese (2 lots)	453	Feb. 23, 1940	Aug. 23, 1941	Berman & Co., Inc.
Roasters	1,118	July 1, 1940	Dec. 1, 1941	Frosted Foods Sales Corp.
Roasters	3,388	July 4, 1940	Dec. 1, 1941	Frosted Foods Sales Corp.
Turkeys (4 lots)	3,440	Dec. 1, 1939	June 1, 1941	Berman & Co., Inc.
Turkeys (2 lots)	1,225	Dec. 4, 1939	June 1, 1941	Berman & Co., Inc.
Turkeys	1,471	Dec. 8, 1939	June 8, 1941	Berman & Co., Inc.
Turkeys (2 lots)	1,129	Dec. 12, 1939	June 12, 1941	Berman & Co., Inc.
Turkeys	2,510	Dec. 28, 1939	June 8, 1941	Berman & Co., Inc.
Turkeys (2 lots)	2,521	Dec. 29, 1939	June 12, 1941	Berman & Co., Inc.
Turkeys	2,379	Jan. 23, 1940	June 23, 1941	Berman & Co., Inc.
Turkeys	632	Jan. 26, 1940	June 23, 1941	Berman & Co., Inc.
Turkeys (2 lots)	2,640	Feb. 1, 1940	*Jan. 1, 1942	Dewey & Almy Chemical Co.
Turkeys	269	†Nov. 16, 1939	Sept. 1, 1941	Frosted Foods Sales Corp.
Turkeys	405	†Nov. 22, 1939	June 1, 1941	Frosted Foods Sales Corp.
Turkeys	453	†Nov. 22, 1939	Sept. 1, 1941	Frosted Foods Sales Corp.
Turkeys (2 lots)	1,386	†Dec. 5, 1939	June 1, 1941	Frosted Foods Sales Corp.
Turkeys (3 lots)	2,911	†Dec. 8, 1939	June 1, 1941	Frosted Foods Sales Corp.
Turkeys (4 lots)	3,791	†Dec. 11, 1939	June 1, 1941	Frosted Foods Sales Corp.
Turkeys	143	†Dec. 12, 1939	Sept. 1, 1941	Frosted Foods Sales Corp.
Turkeys (4 lots)	12,898	†Dec. 18, 1939	June 1, 1941	Frosted Foods Sales Corp.
Turkeys	1,436	†Dec. 20, 1939	June 1, 1941	Frosted Foods Sales Corp.
Turkeys	1,139	†Dec. 27, 1939	June 1, 1941	Frosted Foods Sales Corp.
Turkeys (5 lots)	21,658	Dec. 2, 1939	Apr. 2, 1941	Quincy Market, C. S. & W. Co.
Beef Kidneys	6,873	May 29, 1940	Nov. 29, 1941	Mades Co., Inc., M. M.
Calves' Livers	5,460	Nov. 15, 1940	Mar. 15, 1942	Beane Co., H. E.
Chopped Steak	7,020	†Oct. 24, 1939	June 1, 1941	Frosted Foods Sales Corp.
Chopped Steak (2 lots)	56,700	†Feb. 26, 1940	Aug. 1, 1941	Frosted Foods Sales Corp.
Chopped Steak	13,860	Feb. 27, 1940	Aug. 1, 1941	Frosted Foods Sales Corp.
Chopped Steak	14,040	†Mar. 5, 1940	Aug. 1, 1941	Frosted Foods Sales Corp.
Chopped Steak	19,620	†Mar. 12, 1940	Aug. 1, 1941	Frosted Foods Sales Corp.
Chopped Steak	38,040	†Mar. 25, 1940	Aug. 1, 1941	Frosted Foods Sales Corp.
Chopped Steak	54,480	Apr. 9, 1940	*Dec. 31, 1941	Frosted Foods Sales Corp.
Rump Steak	2,184	†Dec. 19, 1939	July 1, 1941	Frosted Foods Sales Corp.
Sirloin Steaks	114	†Jan. 8, 1940	Sept. 1, 1941	Frosted Foods Sales Corp.
Lamb Flanks	3,650	Nov. 1, 1940	Mar. 1, 1942	Folsom's Market, Inc.
Lamb Flanks	1,000	Nov. 4, 1940	Jan. 1, 1942	Folsom's Market, Inc.
Lamb Fores	634	†Nov. 8, 1939	June 1, 1941	Frosted Foods Sales Corp.
Lamb Fores	4,452	†Dec. 7, 1939	June 1, 1941	Frosted Foods Sales Corp.
Lamb Legs	1,214	†Feb. 23, 1939	Sept. 1, 1941	Frosted Foods Sales Corp.
Lamb Legs	898	†Nov. 17, 1939	June 1, 1941	Frosted Foods Sales Corp.
Pork Loin Roasts	778	†Dec. 16, 1938	*Dec. 31, 1941	Frosted Foods Sales Corp.
Pork Loin Roasts	3,082	†Nov. 13, 1939	*Dec. 1, 1941	Frosted Foods Sales Corp.
Spare Ribs	7,500	Jan. 27, 1940	Mar. 31, 1941	United Markets, Inc.
Dog Meat	60	May 19, 1939	Dec. 31, 1941	Smith, E. H.
Dog Meat	100	June 29, 1939	Dec. 31, 1941	Smith, E. H.
Dog Meat	40	July 14, 1939	Dec. 31, 1941	Smith, E. H.
Dog Meat	90	July 26, 1939	Dec. 31, 1941	Smith, E. H.
Dog Meat	60	Aug. 3, 1939	Dec. 31, 1941	Smith, E. H.
Dog Meat	40	Sept. 20, 1939	Dec. 31, 1941	Smith, E. H.
Dog Meat	120	Sept. 22, 1939	Dec. 31, 1941	Smith, E. H.
Dog Meat	440	Oct. 11, 1939	Dec. 31, 1941	Smith, E. H.
Dog Meat	360	Oct. 20, 1939	Dec. 31, 1941	Smith, E. H.

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*The extension of time granted on this lot was amended before the expiration of the time to which extended. The length of time given includes the total amended period, and the weights given are the initial weights upon which extensions were asked.

†Previously frozen.

TABLE 10.— *Requests for Extension of Time Granted on Goods in Cold Storage, from December 1, 1940 to December 1, 1941 — Concluded*

ARTICLE	Weight (Pounds)	Placed in Storage	Extension Granted to	Name
Dog Meat	520	Oct. 30, 1939	Dec. 31, 1941	Smith, E. H.
Dog Meat	40	Nov. 10, 1939	Dec. 31, 1941	Smith, E. H.
Dog Meat	280	Nov. 17, 1939	Dec. 31, 1941	Smith, E. H.
Dog Meat	320	Nov. 22, 1939	Dec. 31, 1941	Smith, E. H.
Dog Meat	200	Nov. 29, 1939	Dec. 31, 1941	Smith, E. H.
Dog Meat	80	Mar. 29, 1940	Dec. 31, 1941	Smith, E. H.
Pheasants	4,639	Jan. , 1940	Jan. 2, 1942	Conkey & Co., John A.
Rabbits	3,422	Nov. 25, 1940	Feb. 25, 1942	Chamberlain & Co., Inc.
Butterfish	150	June 6, 1940	Sept. 5, 1941	Standard Fish Co.
Chubs	998	May 25, 1940	Sept. 5, 1941	Standard Fish Co.
Cod Cheeks	230	Mar. 1, 1940	July 1, 1941	Warren Fitch Co.
Smoked Cod	2,432	Dec. , 1939	*Oct. 1, 1941	Gorton-Pew Fisheries Co.
Smoked Cod	1,749	Jan. , 1940	Apr. 1, 1941	Gorton-Pew Fisheries Co.
Tom Cod (3 lots)	845	Nov. 16, 1940	Apr. 16, 1942	Brockelman Bros., Inc.
Tom Cod	310	Nov. 19, 1940	Apr. 16, 1942	Brockelman Bros., Inc.
Tom Cod	535	Nov. 21, 1940	Apr. 16, 1942	Brockelman Bros., Inc.
Tom Cod (2 lots)	623	Nov. 23, 1940	Apr. 16, 1942	Brockelman Bros., Inc.
Eels	17,250	Dec. 21, 1939	Jan. 7, 1941	Nagle Co., John
Flounders	1,037	Dec. 12, 1939	Jan. 31, 1941	Arrington, H. R.
Halibut (3 lots)	26,746	Sept. 30, 1940	Mar. 30, 1942	General Seafoods Corp.
Lobster Meat	185	Jan. 26, 1940	Mar. 26, 1941	Consolidated Lobster Co.
Mackerel	448	July 15, 1940	Sept. 1, 1941	American Fish Co.
Mackerel (2 lots)	4,500	Sept. 12, 1940	Dec. 12, 1941	Batchelder & Snyder Co.
Mackerel (13 lots)	30,284	Jun 6, 1940	Feb. 1, 1942	Gloucester Fresh Fish Co.
Mackerel	1,500	June 11, 1940	Feb. 1, 1942	Gloucester Fresh Fish Co.
Mackerel	2,300	June 14, 1942	Feb. 1, 1942	Gloucester Fresh Fish Co.
Mackerel (2 lots)	8,000	June 15, 1940	Feb. 1, 1942	Gloucester Fresh Fish Co.
Mackerel (6 lots)	15,184	June 18, 1940	Feb. 1, 1942	Gloucester Fresh Fish Co.
Mackerel	300	July 6, 1940	Feb. 1, 1942	Gloucester Fresh Fish Co.
Mackerel	900	July 16, 1940	Dec. 31, 1941	Gloucester Fresh Fish Co.
Mackerel	2,250	July 18, 1940	Dec. 31, 1941	Gloucester Fresh Fish Co.
Mackerel	1,350	July 19, 1940	Dec. 31, 1941	Gloucester Fresh Fish Co.
Mackerel	1,200	Aug. 17, 1940	Dec. 31, 1941	Gloucester Fresh Fish Co.
Mackerel	900	Aug. 27, 1940	Dec. 31, 1941	Gloucester Fresh Fish Co.
Mackerel	7,707	July 8, 1940	*Mar. 31, 1942	Henry & Close, Inc.
Mackerel	31,381	July 15, 1940	*Mar. 31, 1942	Henry & Close, Inc.
Mackerel	1,910	Sept. 12, 1940	Mar. 31, 1942	Phillips Co., B. F.
Mackerel	466	June 28, 1940	Sept. 5, 1941	Standard Fish Co.
Polpi	–	Mar. 16, 1940	June 16, 1941	Genoa Fisheries, Inc.
Polpi	7,450	Feb. 8, 1940	May 8, 1941	Russo & Sons Co.
Salmonettes	130	†Nov. 27, 1940	Nov. 27, 1941	Genoa Fisheries, Inc.
Salmonettes	250	May 27, 1940	Nov. 30, 1941	Mantia & Sons Co., John
Salmonettes	80	†Feb. 27, 1941	Feb. 28, 1942	Mantia & Sons Co., John
Salmonettes	80	Nov. 27, 1940	Dec. 27, 1941	Russo & Sons Co.
Sardines	768	Dec. 8, 1939	Feb. 28, 1941	Mantia Fish Corp.
Sardines (2 lots)	2,950	Dec. 9, 1939	Feb. 28, 1941	Mantia Fish Corp.
Sardines	4,300	Oct. 22, 1940	Dec. 22, 1941	Russo & Sons Co.
Scallops	744	Oct. 8, 1940	Dec. 8, 1941	Russo & Sons Co.
Shad	1,750	Sept. 25, 1940	Mar. 25, 1942	Hamilton Co., R. S.
Shad	1,715	June 10, 1940	Sept. 5, 1941	Standard Fish Co.
Shad (2 lots)	3,461	June 13, 1941	Sept. 5, 1941	Standard Fish Co.
Smelts	3,525	Mar. 7, 1940	June 15, 1941	General Seafoods Corp.
Smelts	7,050	Mar. 7, 1940	*Dec. 31, 1941	General Seafoods Corp.
Smelts	1,008	Mar. 11, 1940	June 15, 1941	General Seafoods Corp.
Smelts (2 lots)	10,218	Mar. 11, 1940	*Dec. 31, 1941	General Seafoods Corp.
Smelts	7,155	Mar. 14, 1940	June 15, 1941	General Seafoods Corp.
Smelts	800	Mar. 14, 1940	*Dec. 31, 1941	General Seafoods Corp.
Smelts	4,545	Mar. 15, 1940	June 15, 1941	General Seafoods Corp.
Smelts	1,780	Mar. 15, 1940	*Dec. 31, 1941	General Seafoods Corp.
Smelts	1,030	May 29, 1940	Nov. 29, 1941	General Seafoods Corp.
Smelts	–	Mar. 11, 1940	June 11, 1941	Genoa Fisheries, Inc.
Smelts	1,650	Mar. 14, 1940	May 14, 1941	Harding Co., F. E.
Smelts (2 lots)	51,690	May 27, 1940	*Mar. 27, 1942	Russo & Sons Co.

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*The extension of time granted on this lot was amended before the expiration of the time to which extended. The length of time given includes the total amended period, and the weights given are the initial weights upon which extensions were asked.

†Previously frozen.

TABLE 11.— *Slaughtering Report from December 1, 1940, through November 30, 1941*

Total Number of Carcasses Inspected				156,720
Cattle	28,970	Hogs	49,454	
Calves	75,909	Sheep	2,387	
Total Number of Carcasses Condemned				2,192
Cattle	110	Hogs	403	
Calves	1,677	Sheep	2	

REASONS FOR CONFISCATION	Cattle	Calves	Hogs	Sheep	Totals
Immaturity	–	1,503	–	–	1,503
Cholera	–	–	279	–	279
Tuberculosis	8	3	18	–	29
Died other than by slaughter	8	115	5	1	129
Bruised or injured	28	7	6	–	41
Pneumonia	17	1	13	1	32
Scours	–	22	–	–	22
Anemia	–	3	–	–	3
Emaciation	11	4	6	–	21
Peritonitis	2	–	17	–	19
Septicemia	17	2	4	–	23
Hemorrhagic Septicemia	–	–	22	–	22
Fetus	–	12	–	–	12
Icterus	1	4	9	–	14
Tumor	1	–	2	–	3
Abscessed	1	–	10	–	11
Parturition	2	–	–	–	2
Mastitis	3	–	–	–	3
Milk Fever	1	–	1	–	2
Gangrene	2	–	–	–	2
Petechia	1	–	–	–	1
Exhaustion	–	–	1	–	1
Pericarditis	1	–	–	–	1
Lead Poisoning	1	–	–	–	1
Enteritis	–	1	5	–	6
Strangulation	2	–	–	–	2
Dropsy	1	–	–	–	1
Fever	1	–	2	–	3
Ruptured	–	–	1	–	1
Pleurisy	–	–	2	–	2
Empyemia	1	–	–	–	1
Totals	110	1,677	403	2	2,192

THE DIVISION OF GENITOINFECTIOUS DISEASES

N. A. Nelson, M.D., *Director*

Statistical Summaries

The trend of reporting during the past several years is indicated by the following figures:

Sources of Reports of Gonorrhea

		Physicians			Clinics		Institutions		Military	
Year	Total Cases	Number	Cases	Per Cent	Cases	Per Cent	Cases	Per Cent	Cases	Per Cent
1937 . .	5,856	988	3,140	53.6	2,209	37.7	507	8.7	–	–
1938 . .	4,938	883	2,272	46.0	2,266	45.9	400	8.1	–	–
1939 . .	4,652	782	2,163	46.5	2,147	46.2	342	7.3	–	–
1940 . .	4,014	786	1,815	45.2	1,894	47.2	305	7.6	–	–
1941 . .	3,791	685	1,515	40.0	1,391	36.7	179	4.7	706	18.6

Sources of Reports of Syphilis

		Physicians			Clinics		Institutions		Military	
Year	Total Cases	Number	Cases	Per Cent	Cases	Per Cent	Cases	Per Cent	Cases	Per Cent
1937 . .	6,207	961	2,103	33.9	2,788	44.9	1,316	21.2	–	–
1938 . .	5,674	912	1,814	32.0	2,919	51.4	941	16.6	–	–
1939 . .	4,888	839	1,576	32.3	2,528	51.7	784	16.0	–	–
1940 . .	5,024	877	1,598	31.8	2,537	50.5	889	17.7	–	–
1941 . .	4,613	882	1,635	35.5	2,253	48.8	628	13.6	97	2.1

There were 203 deaths from syphilis (including deaths from general paralysis and tabes dorsalis) at a rate of 6.2 per 100,000 population as compared with a rate of 7.9 last year and an average rate of 7.5 for the preceding five years.

Deaths from congenital syphilis numbered 7 in 1941. Only 15 cases of congenital syphilis under one year of age were reported during the year.

Provision of Treatment

The twenty-five cooperating clinics were paid a total of approximately $227,200 during the fiscal year, an increase of about $11,000 over the previous year. Patients and contacts made 185,705 visits, or nearly 38,200 fewer visits than during 1940. The cost per visit to the Commonwealth is approximately $1.23 as compared to 99 cents in 1940. This increase is due to the fact that expenses have remained constant or have increased and patients have paid less than in previous years. Patients paid approximately $30,850 as compared to $31,200 last year. The total cost of maintaining clinic service was, therefore, approximately $259,900, or $1.40 per visit. The cost of transportation provided patients was $1,800 less than in the year 1940.

Only 25,900 visits were made for the treatment of gonorrhea, as compared to 49,000 last year. This decline is unquestionably due to the effect of the sulfonamides on the disease, principally its rapid therapeutic effect. One hundred and fifty-nine thousand visits for the treatment of syphilis were made as compared to 174,000 last year.

Thirty-three hospitals requested reimbursement for the hospital care of patients with syphilis or gonorrhea, as compared to 38 last year. Hospital care was provided for 653 patients, as compared to 811 last year, at a total cost of $19,711.64, or almost $7,000 less than last year.

The twenty-five cooperating clinics admitted 1,363 new cases of gonorrhea and 2,112 new cases of syphilis, a decrease of 495 cases of gonorrhea and 226 cases of syphilis. The cooperating clinics treated 97 per cent of all gonorrhea treated in clinics in Massachusetts and 90 per cent of all syphilis so treated.

FOLLOW-UP BY BOARDS OF HEALTH

During 1941, 957 cases were referred to 117 boards of health for follow-up.

Year	Cases	Per Cent Found	Number of Communities	No Report from Board of Health	
				Per Cent of Cases	Communities
1937	3,339	52.3	146	4.8	28
1938	2,020	57.4	131	7.5	34
1939	1,650	61.2	126	4.2	24
1940	1,046	66.7	97	3.0	14
1941	957	59.7	117	10.6	16

FOLLOW-UP SERVICE FOR PRIVATE PHYSICIANS

One nurse has been engaged throughout the year in the follow-up of cases for private physicians in the Metropolitan Boston Area. Eighty-five (77 per cent) of the patients were successfully returned to treatment, 9 per cent were lost and 14 per cent still remain active. Of the contacts, 78 per cent were brought to medical attention. The nurse made 343 visits to patients and 99 visits to contacts.

FOLLOW-UP SERVICE FOR SYPHILIS IN PREGNANCY

In 1941 the nurse followed 208 pregnant women in whom 148 pregnancies were terminated. Of the 145 babies, 104 have been examined, none of whom showed any evidence of congenital syphilis.

OTHER DIAGNOSTIC AND TREATMENT SERVICES

Arsenicals and Bismuth:

Free arsenicals and bismuth are supplied to all cooperating clinics and private physicians in the State who request this service.

Sulfathiazole:

Beginning in January, 1941, the Department has distributed sulfathiazole to cooperating clinics only, for the treatment of gonorrhea. The Department also plans to distribute this drug to private physicians for the treatment of gonococcal infections.

Laboratory:

The Wassermann Laboratory reports 400,265 blood and spinal fluid examinations, an increase of almost 70,000 over last year. The Bacteriological Laboratory reported 12,590 smears examined for gonorrhea, which is approximately the same as last year.

EDUCATION AND INFORMATION

During the year the staff lectured to 47 professional and public groups, reaching 5,406 persons.

During the year 167,987 pieces of literature were distributed (163,380 in 1940). *The Bulletin of Genitoinfectious Diseases* was distributed for nine months of the year to every physician in the State and to a large mailing list outside this State.

TRAINING OF PERSONNEL

The Harvard School of Public Health continued to offer a course of training for health officers in genitoinfectious disease control, and the Department has continued to cooperate with the Massachusetts Medical Society in the maintenance of a course of postgraduate instruction for physicians.

NATIONAL DEFENSE

The Department has cooperated with the Selective Service System by providing epidemiologic follow-up of selectees with positive or doubtful blood tests. The following table shows the results of this investigation from December 1, 1940 through December 31, 1941:

	Positive		Doubtful		Total	
1. Total selectees referred for follow-up		476		111		587
2. Total closed by epidemiologists		439		98		537
Infected		338		25		363
Already under treatment	97		13		110	
Returned to treatment	48		6		54	
No further treatment necessary	18		2		20	
No previous treatment	175		4		179	
Not infected		18		59		77
Inducted		17		11		28
Lost		17		2		19
Refuse to cooperate		2		1		3
Referred to Board of Health		16		–		16
Referred out-of-state		31		–		31
3. Cases still active with epidemiologists		37		13		50

The most important relation of the Department to the war effort has been the cooperative program carried on by the Department and the Army and Navy, which provides for the epidemiologic investigation of sources of infection and contacts of infected soldiers and sailors. Department nurses are allowed to enter directly into the camps, the Chelsea Naval Hospital and the U. S. Marine Hospital to interview infected men. The following table shows the results of this investigation from December 1, 1940 through December 31, 1941:

1. Total men interviewed				980
2. Total contacts involved				1,092
(a) Not referred (insufficient information)			400	
(b) Referred, follow-up closed			481	
(1) Followed by nurse		153		
Success	130			
Failure	23			
(2) Followed by police		113		
Success	38			
Failure	66			
No reply	9			
(3) Followed out-of-state		208		
Success	49			
Failure	83			
No reply	76			
(4) Followed by other agency		7		
No reply	7			
(c) Referred, follow-up pending			211	

This program has provided an example of cooperative effort between a civilian health agency and the armed forces which should lead to successful control of the genitoinfections in the Army and Navy in Massachusetts. With the declaration of war on December 8, 1941, the Department found itself already providing important services to the Army and Navy in this area.

THE DIVISION OF SANITARY ENGINEERING

Arthur D. Weston, *Chief Sanitary Engineer*

Foreword

The activities of this division have been presented in tabular form for the year 1941.

In connection with the use of the tables on water consumption, it should be remembered that the per capita water consumption shown is determined by the population of the municipality in which the works are located and not necessarily on the number of persons served. Under these conditions the per capita water consumption in some cities and towns where only a small percentage of the population is served shows a smaller per capita water consumption than is actually the case. In addition, it should also be stated that the average daily and per capita water consumption as shown are not a true indication of the maximum demands in those municipalities where the bulk of the consumption is during the summer months.

The table of chemical analyses of water of public water supplies shows the average results of the total number of samples received from each source during the year. The total number of analyses to obtain this average is shown in the last column. In instances where the water has been found to be uniform in quality only 1, 2 or 3 samples are collected throughout the year; more frequent sampling is unnecessary.

The tables referring to rainfall represent the rainfall as determined by this Department at seven long term rainfall stations well distributed throughout the State. The rainfall for certain sections of the State may vary considerably from that indicated by this average.

The tables relative to yield of drainage areas and tables relative to sewage treatment works are presented in order that there may be a continuity of records.

Average Daily Consumption of Water in Various Cities and Towns in 1941

City or Town	Population	Gallons	Gallons per Inhabitant	City or Town	Population	Gallons	Gallons per Inhabitant
Metropolitan Water District				Barre	3,532	67,200	19
Arlington	40,308	2,278,500	57	Bedford	3,931	181,200	46
Belmont	27,274	1,626,200	60	Belchertown	3,503	33,400	10
BOSTON	770,816	97,767,600	127	Bellingham	2,979	83,000	28
CHELSEA	41,259	3,554,800	86	BEVERLY	25,537	1,787,900	70
EVERETT	46,784	5,762,300	123	Billerica	8,190	350,500	43
Lexington	13,662	749,700	55	Blandford	481	16,800	35
MALDEN	58,157	4,378,500	75	Bourne	3,315	148,000	45
MEDFORD	63,411	3,630,300	57	Braintree	16,378	1,344,000	82
MELROSE	25,548	1,464,500	57	Bridgewater	8,902	235,800	26
Milton	18,820	1,039,600	55	BROCKTON	62,343	3,011,000	48
Nahant	1,852	252,400	136	Brookfield	1,410	41,000	29
QUINCY	75,810	5,076,000	67	Brookline	49,786	5,032,200	101
REVERE	34,405	1,924,500	56	CAMBRIDGE	110,879	13,750,000	124
SOMERVILLE	102,458	9,913,000	97	Canton	6,381	717,000	112
Stoneham	10,765	657,600	61	Chatham	2,153	114,000	53
Swampscott	10,817	822,100	76	Chelmsford	8,173	350,900	43
Watertown	35,427	3,003,500	85	CHICOPEE	41,664	3,483,300	84
Winthrop	16,768	1,401,900	84	Clinton	12,453	996,400	80
Abington and Rockland	13,837	774,000	56	Cohasset	3,111	336,000	108
Acton	2,714	132,000	49	Concord	8,022	518,000	65
Acushnet	4,184	130,000	31	Danvers and Middleton	16,661	1,013,100	61
Adams	12,608	1,333,000	106	Dalton	4,206	1,400,000	333
Agawam	7,969	426,000	53	Dartmouth	9,011	261,000	29
Amesbury	10,932	789,300	72	Deerfield	2,684	42,900	16
Amherst	6,410	628,600	98	Dedham	15,535	1,135,000	73
Andover	11,238	1,340,500	119	Douglas	2,660	280,600	105
Ashburnham	2,296	91,700	40	Dracut	7,507	269,000	36
Ashland	2,479	641,000	259	Dunstable	453	2,835	6
Athol	11,266	581,900	52	Duxbury	2,382	302,000	127
ATTLEBORO	22,118	1,303,534	59	East Bridgewater	3,864	217,000	56
Avon	2,335	147,000	63	East Brookfield	1,030	36,400	35
Ayer	3,572	267,100	75	Easthampton	10,316	964,100	93
Barnstable	8,392	769,000	92	East Longmeadow	3,409	114,500	34
				Easton	5,135	297,000	58

Average Daily Consumption of Water in Various Cities and Towns in 1941 — Concluded

CITY OR TOWN	Population	Gallons	Gallons per Inhabitant
Edgartown	1,370	165,500	121
Fairhaven	10,938	490,000	45
FALL RIVER	115,428	7,505,500	65
Falmouth	6,946	917,885	132
FITCHBURG	41,849	5,474,300	131
Foxborough	6,397	631,000	99
Framingham	23,327	1,568,000	67
Franklin	7,303	465,000	64
GARDNER	20,206	1,086,700	54
Georgetown	1,803	49,900	28
GLOUCESTER	24,046	1,928,100	80
Grafton	7,457	112,000	15
Great Barrington	5,824	445,500	76
Greenfield	15,672	1,511,600	96
Groton	2,553	445,000	174
Groveland	0,000	00,000	00
Hamilton	2,037	65,600	32
Hanover	2,908	211,000	73
Hanson and Pembroke	4,338	144,700	33
Harwich	2,567	62,000	24
HAVERHILL	46,752	4,246,300	91
Hingham and Hull	10,214	1,169,100	114
Holden	3,926	81,900	21
Holliston	3,015	112,000	37
HOLYOKE	53,750	7,531,400	140
Hudson	8,042	456,500	57
Ipswich	6,374	330,100	52
Kingston	2,791	253,000	91
Lancaster	3,038	150,900	50
Lanesborough	1,338	31,300	23
LAWRENCE	84,323	4,363,700	52
Leicester	4,936	189,600	38
Leominster	22,292	3,202,000	144
Lincoln	1,825	331,500	182
Littleton	1,675	106,100	63
Longmeadow	5,927	421,000	71
LOWELL	101,644	5,686,100	56
Ludlow	8,181	332,400	41
Lunenburg	2,209	81,900	37
LYNN	98,123	8,773,800	89
Lynnfield	2,365	74,500	32
Manchester	2,472	371,300	150
Mansfield	6,530	635,000	97
Marblehead	10,993	853,900	78
Marion	2,063	200,000	97
MARLBOROUGH	15,154	851,300	56
Marshfield	2,488	377,000	151
Mattapoisett	1,608	100,000	62
Maynard	6,812	328,000	48
Medfield	4,428	82,000	19
Medway	3,303	260,000	79
Merrimac	2,342	207,300	89
Methuen	22,041	1,081,800	49
Middleborough	9,065	339,000	37
Milford and Hopedale	18,586	922,000	50
Millbury	7,004	370,000	53
Millis	2,314	192,000	83
Montague and Erving	8,910	912,800	102
Nantucket	3,401	466,290	137
Natick	13,851	955,700	69
Needham	12,568	769,000	61
NEW BEDFORD	110,405	10,053,200	91
NEWBURYPORT	13,916	1,521,800	109
NEWTON	70,619	5,363,200	76
NORTH ADAMS	22,239	2,912,300	131
North Andover	7,596	513,200	68
North Attleborborough	10,390	904,000	87
Northborough	2,382	100,600	42
Northbridge	10,242	772.000	75
Northampton	24,848	3,206,900	129
North Brookfield	3,328	438,100	131
North Reading	2,999	52,500	18
Norton	3,143	219,000	70
Norwood	15,383	1,090,700	71
Oak Bluffs	1,584	122,000	77
Oxford	4,698	150,000	32
Palmer	9,149	348,300	38
Paxton	803	17,400	22
PEABODY	21,711	2,825,000	130
Pepperell	3,136	315,300	100
PITTSFIELD	50,118	6,991,200	139
Plainville	1,302	101,416	78
Plymouth	13,300	1,417,000	107
Provincetown	3,668	363,000	99
Randolph and Holbrook	10,968	669,700	61
Reading	10,899	672,100	62
Rockport	3,556	373,300	105
Russell	1,242	40,700	33
SALEM	41,213	4,461,600	108
Salisbury	2,402	306,300	128
Saugus	14,825	785,000	53
Scituate	4,187	522,000	125
Sharon	3,748	420,600	112
Shelburne	1,642	97,300	59
Shirley	2,620	90,900	35
Shrewsbury	7,674	405,700	53
Somerset	5,916	288,000	49
Southbridge	17,033	919,000	54
Southwick	1,587	38,300	24
SPRINGFIELD	149,554	17,200,000	115
Sterling	1,744	23,300	13
Stoughton	8,663	691,300	80
Sturbridge	2,289	95,600	42
Sudbury	1,777	21,000	12
TAUNTON	37,395	2,823,000	75
Tisbury	1,995	246,000	123
Townsend	2,090	155,400	74
Uxbridge	6,421	352,800	55
Wakefield	16,223	839,500	52
Walpole	7,443	1,010,000	136
WALTHAM	40,020	2,798,000	70
Ware	7,557	372,000	49
Wareham	6,427	281.000	44
Warren	3,531	102,000	29
Wayland	3,537	388,600	110
Webster	13,186	680,240	52
Wellesley	15,477	1,444,000	93
West Bridgewater	3,247	199,400	61
West Brookfield	1,413	99,500	70
WESTFIELD	18,794	2,099,100	112
Westford	3,838	131,200	34
Weston	3,590	242,000	67
West Newbury	1,523	19,300	13
West Springfield	17,138	2,033,900	119
Weymouth	24,292	1,432,000	59
Whitman	7,793	328.000	42
Wilbraham	3,055	64,100	21
Williamsburg	1,684	87,700	52
Wilmington	4,675	272,800	58
Winchendon	6,575	263,200	40
Winchester	15,423	1,109,000	72
WOBURN	19,762	1,757,100	89
WORCESTER	194,339	19,482,000	100
Wrentham	4,777	209.000	44
Yarmouth	2,324	97,000	42

Analyses of the Water of Public Water Supplies — Averages of Chemical Analyses of Surface-Water Sources for the Year 1941

City or Town	Source	(Parts per Million)									pH	No. of Samples
				Ammonia								
		Color	Residue on Evaporation	Free	Total Albuminoid	Nitrogen as Nitrates	Chlorides	Hardness	Alkalinity	Fe		
Metropolitan Water District	Wachusett Reservoir, upper end	20	38	.023	.114	.09	2.2	18	13	.12	6.6	6
	Wachusett Reservoir, lower end	9	35	.008	.079	.09	2.4	15	12	.04	6.7	6
	Sudbury Reservoir	12	37	.018	.104	.07	2.7	17	12	.06	6.7	6
	Framingham Reservoir No. 3	11	40	.017	.093	.08	3.1	19	13	.11	6.7	6
	Ware River at Coldbrook intake	36	65	.074	.188	.08	2.4	15	18	.34	6.7	4
	Hopkinton Reservoir	40	39	.023	.161	.08	3.2	13	11	.17	6.3	6
	Ashland Reservoir	46	44	.025	.139	.08	4.3	13	11	.14	6.4	6
	Framingham Reservoir No. 2	33	135	.102	.152	.09	34.8	29	4	.70	4.7	6
	Lake Cochituate	13	69	.024	.138	.21	7.5	29	19	.12	6.9	6
	Chestnut Hill Reservoir	13	41	.130	.125	.08	3.9	20	13	.09	6.7	6
	Weston Reservoir	11	36	.034	.097	.11	3.0	17	12	.09	6.6	6
	Spot Pond	12	37	.099	.105	.09	3.8	17	12	.11	6.6	6
	Tap in State House	13	37	.140	.105	.15	3.8	18	12	.10	6.7	2
	Tap in Revere	11	39	.021	.081	.13	3.9	18	13	.19	6.7	6
	Tap in Quincy	10	39	.013	.064	.20	4.1	20	14	.14	6.7	6
Abington	Big Sandy Pond	5	41	.012	.120	.06	8.4	13	12	.08	6.7	4
Acushnet (Fire and Water District)	New Bedford Water Supply											
Adams (Fire District)	Bassett Brook Reservoir	3	57	.007	.055	.18	1.5	38	39	.05	7.1	4
Agawam	Springfield Water Supply: (Cobble Mountain Supply)											
Amherst (Water C)	Atkins Pond	12	29	.069	.218	.07	1.5	9	7	.19	6.1	4
	Amethyst Brook-Intake Reservoir	25	36	.023	.070	.11	1.7	11	10	.07	6.5	4
Andover	Haggett's Pond	12	50	.022	.138	.32	.52	24	15	.04	6.7	4
Arlington	Metropolitan Water Supply											
Ashburnham	Upper Naukeag Lake	7	22	.010	.053	.07	2.0	4	6	.10	5.5	4
Ashfield (Water Co.)	Highland Spring Reservoir	19	48	.011	.096	.08	1.2	29	28	.15	6.9	3
Athol	Buckman Brook Reservoir (Newton Reservoir)	16	32	.022	.147	.08	1.6	11	8	.14	6.0	6
	Thousand Acre Meadow Brook	117	55	.040	.240	.07	1.8	18	10	.16	5.5	6
	Phillipston Reservoir	41	39	.035	.205	.11	3.5	15	10	.19	6.3	6
	Raw water at filter plant	27	35	.025	.157	.10	2.4	13	9	.22	5.9	6
	Final effluent	1	62	.012	.044	.08	2.5	24	27	.03	7.9	6
Barre	Reservoir	8	39	.046	.169	.08	2.9	18	11	.11	6.5	4
Belmont	Metropolitan Water Supply											
Beverly	Joint supply with Salem											
Blackstone	Woonsocket Supply											
Blandford (Fire District)	Freeland Brook	3	33	.007	.019	.27	2.1	16	14	.04	6.8	3
Boston	Metropolitan Water Supply											
Braintree	Great Pond (raw water)	26	60	.038	.213	.30	9.0	20	12	.16	6.7	6
	Great Pond, filtered	4	69	.033	.093	.25	9.0	27	18	.04	7.3	6
Brockton	Silver Lake	7	33	.013	.087	.08	6.1	8	10	.05	6.6	4

Brookfield	Cooley Hill Reservoir	10	36	.016	.060	.10	2.2	16	9	.20	5.9	1
CAMBRIDGE	Upper Hobbs Brook Reservoir	15	64	.066	.208	.15	5.6	27	16	.14	6.7	4
	Lower Hobbs Brook Reservoir	15	61	.028	.188	.11	5.6	26	17	.05	6.9	4
	Stony Brook Reservoir	29	69	.032	.163	.34	6.5	33	21	.13	6.9	4
	Fresh Pond	11	83	.056	.160	.36	8.4	40	25	.06	7.1	5
	Filter effluent	3	86	.023	.064	.35	7.4	44	24	.06	8.0	5
CHELSEA	Metropolitan Water Supply											
Cheshire (Water Co.)	Kitchen Brook Reservoir	2	58	.013	.025	.18	1.2	39	40	.05	7.2	2
Chester	Austin Brook Reservoir	10	38	.003	.044	.09	1.3	21	15	.04	6.7	2
	Horn Pond	12	38	.011	.131	.09	1.1	22	17	.05	6.8	2
CHICOPEE	Cooley Brook Reservoir, raw water	23	51	.051	.091	.92	6.1	21	18	.17	6.7	6
	Cooley Brook Reservoir, filtered	1	67	.085	.027	.77	2.8	34	22	.04	7.9	6
	Morton Brook	7	62	.008	.020	.23	3.3	24	15	.22	6.7	6
Clinton	Lower Lynde's Reservoir	11	31	.030	.126	.14	1.7	13	11	.13	6.5	4
	Heywood Pond	14	26	.026	.119	.08	1.7	13	8	.14	6.1	4
	Spring Basin	10	58	.030	.113	.16	2.9	24	22	.08	6.8	4
Colrain (Griswoldville)	McClellan Brook Reservoir	5	74	.006	.036	.05	1.5	52	48	.07	7.0	2
Colrain (Fire District No. 1)	Mountain Brook Reservoir	7	80	.002	.016	.06	2.1	64	60	.09	7.3	2
Concord	Nagog Pond	7	33	.012	.108	.08	3.9	9	9	.05	6.4	4
Dalton (Fire District)	Egypt Brook Reservoir	17	34	.007	.067	.07	1.1	15	11	.10	6.6	4
	Raw water	21	41	.007	.070	.08	1.1	20	17	.10	6.8	4
	Filtered water	22	52	.003	.047	.07	1.0	29	30	.05	7.7	3
	Windsor Reservoir	22	60	.007	.075	.07	1.1	31	31	.10	6.9	4
Danvers	Middleton Pond	39	44	.031	.188	.09	4.0	18	11	.19	6.5	6
Dartmouth	New Bedford Water Supply											
Deerfield (South Deerfield Water Supply District)	Roaring Brook Reservoir	14	67	.005	.061	.11	1.6	45	40	.42	7.2	3
East Bridgewater	Brockton Water Supply											
East Longmeadow	Springfield Water Supply (Cobble Mountain Supply)											
Egremont (South Egremont Water Company)	Goodale Brook Reservoir	2	49	.010	.022	.09	1.3	32	31	.05	7.2	2
Erving (Millers Falls Fire and Water District)	Montague (Turners Falls Fire District) Water Supply											
EVERETT	Metropolitan Water Supply											
FALL RIVER	North Watuppa Lake	9	32	.014	.114	.07	5.7	9	6	.07	5.6	5
Falmouth	Long Pond, before lime treatment	4	35	.010	.080	.08	9.7	6	8	.04	6.5	4
	Long Pond, treated	4	36	.062	.072	.08	9.7	11	11	.04	8.3	4
FITCHBURG	Ashby Reservoir	22	30	.044	.139	.07	1.7	10	7	.37	5.6	5
	Scott Reservoir	8	31	.065	.195	.08	1.7	8	8	.15	6.1	3
	Meetinghouse Pond	5	30	.045	.119	.07	2.2	14	9	.05	6.3	4
	Wachusett Lake	9	25	.027	.094	.08	2.0	9	9	.16	6.2	4
	Falulah Brook	21	28	.016	.100	.09	1.7	8	6	.20	5.6	4
	Lovell Reservoir	10	30	.034	.117	.08	1.9	6	6	.12	5.7	4
GARDNER	Crystal Lake	11	42	.017	.132	.08	2.2	23	16	.07	6.9	4
GLOUCESTER	Haskell Reservoir	12	38	.012	.081	.07	8.5	7	5	.21	5.4	4
	Dike's Brook Reservoir	27	41	.020	.116	.07	9.6	7	6	.59	5.4	5
	Wallace Reservoir	14	43	.030	.143	.07	10.6	7	7	.24	5.7	5
	Babson Reservoir	31	58	.023	.132	.09	12.2	14	7	.32	5.7	4
Great Barrington (Housatonic Water Works Company)	Long Pond, raw water	6	84	.015	.157	.08	1.2	75	64	.07	7.5	6
	Filtered Water	2	90	.004	.078	.10	1.3	80	69	.04	7.3	6

Averages of Chemical Analyses of Surface-Water Sources, etc. — Continued

City or Town	Source	(Parts per Million)										
		Color	Residue on Evaporation	Ammonia		Nitrogen as Nitrates	Chlorides	Hardness	Alkalinity	Fe	pH	No. of Samples
				Free	Total Albuminoid							
Great Barrington (Fire District)	East Mountain Reservoir	5	53	.035	.068	.09	1.3	43	40	.05	7.3	4
Greenfield	Filter Plant, raw water	4	61	.010	.020	.14	1.5	40	38	.05	7.1	6
	Filter Plant, outlet of filter	1	62	.005	.012	.11	1.5	40	37	.03	7.2	6
Groveland	Haverhill Water Supply (Johnson's Pond)											
Hadley (Water Supply District)	Hart's Brook Reservoir	8	51	.010	.064	.14	1.8	21	21	.14	7.0	3
Hanson	Brockton Water Supply											
Hatfield	Running Gutter Brook Reservoir	6	74	.004	.023	2.7	1.7	35	26	.11	7.2	3
Haverhill	Millvale Reservoir	38	57	.048	.203	.11	3.9	23	20	.16	6.7	5
	Johnson's Pond	12	58	.050	.152	.09	4.2	27	26	.08	6.9	5
	Crystal Lake	13	36	.037	.119	.08	3.7	16	14	.05	6.6	5
	Pentucket Lake	12	43	.031	.177	.09	4.0	21	18	.17	6.8	5
	Kenoza Lake	17	51	.022	.145	.09	4.2	23	20	.08	6.8	5
Hingham (Water Co.)	Accord Pond	16	34	.011	.111	.09	6.5	9	8	.12	6.2	6
Hinsdale (Fire District)	Reservoir	6	20	.002	.029	.09	1.1	7	7	.12	5.5	3
Holbrook	Joint supply with Randolph											
Holden	Rutland Water Supply											
Holyoke	Hugh McLean Reservoir	9	37	.017	.099	.08	1.4	19	16	.14	6.8	6
	Carmody Reservoir	18	38	.022	.099	.07	1.6	14	13	.11	6.6	6
	Wright and Ashley ponds	11	44	.006	.097	.06	1.4	21	21	.07	7.0	6
	White Reservoir	15	38	.023	.129	.07	1.4	21	17	.20	6.7	6
	Whiting Street Reservoir	5	48	.027	.118	.07	1.6	25	25	.09	7.0	6
Hopedale	Milford Water Supply											
Hudson	Gates Pond	6	31	.013	.128	.07	2.8	13	11	.11	6.6	4
Hull	Hingham Water Supply											
Huntington (Fire District)	Cold Brook Reservoir	9	40	.002	.026	.10	1.8	20	17	.10	6.4	5
Ipswich	Dow's Brook Reservoir	18	57	.032	.165	.09	7.3	23	20	.07	6.9	4
	Bull Brook Reservoir	77	75	.028	.202	.12	7.9	31	27	.17	6.7	4
Lancaster	Clinton Water Supply											
Lawrence	Merrimack River	37	70	.211	.284	.097	5.1	26	10	.37	6.6	10
	Merrimack River, filtered	10	81	.169	.113	.141	6.7	34	14	.14	7.1	10
Lee (Berkshire Water Co.)	Codding Brook Upper Reservoir	9	39	.002	.031	.09	1.1	20	19	.05	7.0	4
	Codding Brook Lower Reservoir	9	38	.006	.030	.09	1.1	18	19	.07	7.0	4
	Basin Pond Brook	41	48	.011	.104	.09	1.3	24	19	.06	6.8	4
Lenox (Water Co.)	Lower Root Reservoir	5	82	.012	.031	.09	1.3	77	71	.13	7.3	4
	Woolsey Reservoir	1	81	.008	.020	.05	1.4	45	41	.04	7.2	4
Leominster	Fall Brook Reservoir	7	24	.025	.105	.07	1.8	6	7	.10	6.0	5
	Haynes Reservoir	15	23	.054	.167	.07	1.7	8	8	.22	6.1	5
	Morse Reservoir	8	23	.035	.113	.06	1.7	6	7	.09	6.0	5
	No-Town Reservoir	10	24	.029	.133	.08	1.7	5	7	.17	5.3	5
	No-Town Reservoir and Simonds Pond, filtered	4	45	.017	.045	.10	1.8	27	17	.07	9.1	5

Lexington	Metropolitan Water Supply											
Lincoln	Sandy Pond	7	31	.043	.139	.09	4.7	14	7	.30	6.4	3
Longmeadow	Springfield Water Supply (Cobble Mountain Supply)											
Ludlow	Springfield Water Supply (Ludlow Reservoir Supply)											
Lunenburg	Leominster Water Supply											
LYNN	Breeds Pond	35	69	.033	.174	.12	8.8	31	17	.17	6.8	4
	Birch Pond	12	52	.022	.154	.12	8.7	24	16	.11	6.8	4
	Hawkes Pond	48	82	.023	.300	.12	8.4	34	33	.28	6.9	4
	Walden Pond	50	85	.020	.244	.09	9.3	30	27	.40	6.8	4
Lynnfield (Water District)	Lynn Water Supply											
MALDEN	Metropolitan Water Supply											
Manchester	Gravel Pond	10	46	.007	.094	.06	8.6	11	13	.09	6.8	4
MARLBOROUGH	Lake Williams	5	67	.045	.147	.09	7.9	31	24	.05	7.0	4
	Millham Brook Reservoir	49	64	.037	.153	.35	4.9	27	20	.17	6.8	3
Maynard	White Pond	3	26	.016	.079	.06	2.5	8	9	.06	6.6	4
MEDFORD	Metropolitan Water Supply											
MELROSE	Metropolitan Water Supply											
Middleton	Joint supply with Danvers											
Milford (Water Co.)	Charles River, inlet to filters	30	40	.013	.139	.11	3.4	13	9	.19	6.2	4
	Dug wells and Charles River, filtered	17	51	.029	.043	.13	3.8	30	23	.18	7.6	4
Milton	Metropolitan Water Supply											
Monroe (Water District)	Phelps Brook Reservoir, raw water	9	36	.009	.034	.12	1.3	19	11	.08	6.6	3
	Phelps Brook Reservoir, filtered	8	43	.004	.034	.14	2.3	20	14	.07	6.9	5
Montague (Turners Falls Fire District)	Lake Pleasant	5	34	.036	.159	.07	4.8	10	10	.32	6.5	3
Monterey (Water Co.)	Reservoir	4	91	.002	.013	.06	1.7	85	77	.04	7.2	3
Nahant	Metropolitan Water Supply											
NEW BEDFORD	Great Quittacas Pond	29	37	.018	.128	.08	5.6	11	9	.09	6.2	5
	Little Quittacas Pond	22	37	.016	.142	.07	5.4	10	9	.13	6.4	5
NEWBURYPORT	Artichoke River	27	57	.187	.345	.08	4.8	25	22	.23	–	4
	Mixed raw water	18	71	.022	.210	.12	5.9	27	25	.04	6.8	4
	Ground and reservoir water, filtered	9	62	.007	.100	.39	6.2	29	24	.04	6.5	4
NORTH ADAMS	Broad Brook	8	49	.009	.038	.11	1.2	33	29	.04	7.0	5
	Notch Brook Reservoir	5	80	.120	.071	.17	1.1	71	61	.10	7.5	5
	Mount Williams Reservoir	3	72	.011	.066	.07	1.3	56	55	.04	7.5	5
NORTHAMPTON	Middle Reservoir (Roberts Meadow Brook)	21	45	.012	.087	.07	1.5	25	21	.17	6.9	5
	Mountain Street Reservoir	8	41	.009	.042	.06	1.3	23	19	.05	6.9	5
North Andover	Great Pond	14	52	.013	.181	.06	5.0	21	13	.09	6.6	4
Northborough	Lower Reservoir (Cold Harbor Brook)											
	Raw water	34	47	.033	.194	.10	3.1	18	13	.23	6.5	4
	Final effluent	4	67	.003	.054	.08	2.9	16	24	.06	7.1	4
North Brookfield	Doane Pond	32	37	.008	.245	.08	1.7	11	10	.68	6.3	5
	North Pond	21	31	.027	.255	.08	1.7	11	9	.26	6.3	4
Northfield (Water Co.)	Minot Brook Reservoir	12	37	.005	.029	.09	1.3	17	15	.07	6.7	2
Northfield (Northfield Schools, Inc.)	Upper Reservoir on Louisiana Brook	18	38	.038	.083	.07	1.5	17	15	.39	6.8	2
	Lower Reservoir on Louisiana Brook	17	37	.024	.045	.07	1.5	20	16	.36	6.8	2
Norwood	Buckmaster Pond, raw water	11	69	.001	.139	.53	7.8	27	16	.23	6.7	4
	Buckmaster Pond, filtered	6	76	.010	.070	.54	8.7	25	16	.09	6.5	4
Orange	Coolidge Brook Reservoir	20	33	.017	.049	.10	1.5	9	11	.07	6.5	3

Averages of Chemical Analyses of Surface-Water Sources, etc.— Concluded

City or Town	Source	(Parts per Million)									pH	No. of Samples
		Color	Residue on Evaporation	Ammonia		Nitrogen as Nitrates	Chlorides	Hardness	Alkalinity	Fe		
				Free	Total Albuminoid							
Palmer (Fire District No. 1) (Thorndike)	Graves Brook, Lower Reservoir	8	34	.012	.078	.06	1.6	16	15	.23	6.7	4
	Hamilton Reservoir	8	39	.005	.034	.06	2.2	16	19	.08	6.5	3
PEABODY	Spring Pond	12	65	.035	.138	.08	10.3	26	17	.12	6.8	6
	Suntaug Lake	22	66	.059	.172	.10	11.6	25	15	.14	6.7	6
Pembroke	Brockton Water Supply											
PITTSFIELD	Sackett Reservoir	11	67	.009	.035	.09	1.2	63	49	.04	7.1	5
	Hathaway Brook Reservoir	3	94	.008	.022	.14	1.4	93	78	.06	7.4	5
	Ashley Reservoir	15	58	.012	.074	.07	1.2	41	37	.05	7.3	5
	Ashley Lake	11	35	.016	.097	.07	1.2	18	16	.09	6.9	5
	Farnham Reservoir	46	39	.050	.171	.15	1.2	16	10	.43	6.4	5
	Mill Brook Reservoir	43	42	.034	.162	.12	1.4	17	14	.31	6.6	5
PITTSFIELD	Sand Wash Brook	87	47	.055	.235	.12	1.2	20	9	.66	5.7	5
Plainville	North Attleborough Water Supply											
Plymouth	Little South Pond	4	31	.021	.128	.07	7.1	7	7	.04	6.2	3
	Great South Pond	4	27	.030	.093	.07	6.8	5	8	.04	6.4	3
QUINCY	Metropolitan Water Supply											
Randolph	Great Pond, raw water	26	58	.024	.182	.31	8.6	21	13	.20	6.6	6
	Filtered water	9	69	.014	.094	.36	8.9	21	14	.09	6.4	6
REVERE	Metropolitan Water Supply											
Rockland	Joint Supply with Abington											
Rockport	Cape Pond, raw water	33	92	.044	.237	.08	20.8	20	8	1.03	5.4	5
	Filtered water	5	114	.042	.091	.10	22.4	34	15	.06	7.9	5
Russell	Black Brook Reservoir	14	32	.015	.055	.09	1.3	13	14	.08	6.7	3
	Black Brook Reservoir, filtered	14	31	.005	.038	.11	1.3	13	10	.22	6.5	3
Rutland	Muschopauge Lake	8	33	.029	.121	.08	4.1	18	11	.06	6.6	3
SALEM	Ipswich River at Pumping Station	42	113	.059	.142	.64	9.2	57	45	.35	—	4
	Longham Reservoir	85	70	.057	.322	.22	10.2	24	15	.80	6.3	4
	Wenham Lake	27	62	.056	.166	.16	9.2	31	24	.28	6.8	4
	Wenham Lake, filtered	3	71	.083	.086	.16	9.3	32	14	.05	6.3	4
Saugus	Lynn Water Supply											
Shelburne (Shelburne Falls Fire District)	Fox Brook Reservoir	5	66	.010	.029	.26	1.4	40	39	.16	7.2	3
SOMERVILLE	Metropolitan Water Supply											
Southborough	Sudbury Reservoir	8	33	.005	.064	.06	2.7	19	12	.06	6.7	2
Southbridge	Hatchet Brook Reservoir No. 3	10	29	.010	1.03	.07	2.0	11	9	.14	6.3	4
	Hatchet Brook Reservoir No. 4	15	30	.011	.128	.07	1.9	10	10	.24	6.3	4
	Hatchet Brook Reservoir No. 5	19	28	.041	.099	.08	2.0	8	8	.14	5.9	4
South Hadley (South Hadley Falls Fire District No. 1)	Buttery Brook Reservoir	10	47	.062	.114	.35	3.9	21	14	.46	6.7	4
	Leaping Well Reservoir	7	32	.030	.090	.05	1.6	13	13	.13	6.8	4

South Hadley (Fire District No. 2)	Elmer Brook, raw water	5	73	.015	.046	.19	2.1	42	34	.05	7.1	3
	Filtered water	2	69	.009	.016	.20	2.3	40	33	.05	7.0	3
Southwick	Springfield Water Supply (Cobble Mountain Supply)											
Spencer	Shaw Pond	7	23	.012	.088	.08	2.5	10	9	.12	6.4	4
SPRINGFIELD	Cobble Mountain Reservoir	15	33	.022	.094	.08	1.2	16	10	.17	6.5	5
	Cobble Mountain Reservoir, filtered	8	28	.002	.041	.09	1.3	11	11	.04	6.3	5
	Ludlow Reservoir, unfiltered	13	33	.022	.114	.06	1.7	15	17	.08	6.6	4
	Ludlow Reservoir, filtered	9	35	.003	.075	.07	1.6	14	12	.07	6.7	3
Stockbridge (Water Co.)	Lake Averic	6	70	.009	.041	.05	1.3	52	51	.09	7.5	3
Stoneham	Metropolitan Water Supply											
Stoughton	Muddy Pond	4	47	.011	.019	.13	3.7	21	21	6.8	.06	3
Sunderland (Water Co.)	Saw Mill Brook Reservoir	2	69	.003	.009	.11	1.6	42	43	.04	7.3	3
Swampscott	Metropolitan Water Supply											
TAUNTON	Assawompsett Pond	23	31	.024	.146	.09	5.1	9	7	.14	6.2	5
	Elder's Pond	10	33	.020	.130	.11	5.4	7	7	.05	6.3	5
Wakefield	Crystal Lake	9	72	.033	.160	.37	8.2	30	24	.09	6.9	4
	Crystal Lake, filtered	9	69	.006	.077	.42	8.7	32	25	.08	6.8	4
Wareham (Onset Fire District)	Jonathan Pond	1	29	.021	.149	.08	5.9	3	7	.05	6.2	4
Watertown	Metropolitan Water Supply											
West Bridgewater	Brockton Water Supply											
WESTFIELD	Montgomery Reservoir	32	33	.033	.123	.09	1.4	10	9	.14	6.4	5
	Winchell Reservoir	7	30	.017	.049	.07	1.4	10	12	.07	6.7	5
	Granville Reservoir	7	26	.024	.090	.07	1.4	8	10	.12	6.5	5
Westhampton (Water Co.)	Reservoir	7	44	.006	.030	.07	1.5	21	22	.11	6.9	3
West Newbury	Tap in Town, Groveland Supply	15	62	.010	.098	.10	5.6	28	25	.15	6.7	2
West Springfield	Bear Hole Brook Reservoir	10	76	.016	.054	.07	1.6	52	46	.18	7.2	4
	Bear Hole Brook Reservoir, filtered	4	75	.002	.022	.09	1.7	53	47	.04	7.1	4
West Stockbridge (East Mountain Water Co.)	East Mountain Reservoir	3	61	.002	.019	.15	1.6	37	31	.04	7.2	2
Weymouth	Great Pond	27	43	.007	.125	.09	6.1	10	6	.22	5.5	6
	Great Pond, filtered	6	62	.006	.062	.08	6.4	10	32	.09	7.8	6
Whitman	Brockton Water Supply											
Wilbraham	Springfield Water Supply (Ludlow Reservoir Supply)											
Williamsburg	Unquomonk Brook Reservoir	11	40	.007	.069	.08	1.3	24	18	.16	6.9	3
Williamstown (Water Co.)	Paul Brook	2	63	.009	.015	.09	1.1	41	42	.06	7.6	3
	Rattlesnake Brook Reservoir	4	86	.003	.017	.07	1.1	78	72	.05	7.6	3
Winchester	North Reservoir	7	42	.017	.121	.08	4.6	22	12	.08	6.7	8
	Middle Reservoir	12	36	.039	.181	.08	4.6	19	9	.19	6.4	7
	South Reservoir	7	39	.031	.108	.08	4.6	21	11	.08	6.6	8
Winthrop	Metropolitan Water Supply											
WORCESTER	Pine Hill Reservoir	19	38	.122	.154	.10	2.8	17	11	.42	6.5	5
	Upper Holden Reservoir	12	33	.028	.119	.08	2.5	14	11	.25	6.5	5
	Lower Holden Reservoir	9	30	.024	.113	.08	2.5	12	10	.10	6.6	5
	Leicester Reservoir (Lynde Reservoir)	12	36	.020	.111	.08	2.5	16	11	.19	6.6	5
	Bottomly Reservoir (Kettle Brook No. 4)	19	46	.038	.206	.20	2.7	19	11	.37	6.5	5
	Kent Reservoir (Kettle Brook No. 1)	15	38	.022	.119	.08	2.5	20	11	.14	6.6	5
	Mann Reservoir (Kettle Brook No. 2	14	38	.016	.105	.08	2.6	19	11	.15	6.5	5
	Kendall Reservoir	14	35	.060	.124	.09	2.5	12	10	.30	6.5	5
	Quinapoxet Pond	29	34	.015	.126	.09	1.9	13	10	.08	6.4	5

Averages of Chemical Analyses of Ground-Water Sources for the Year 1941

City or Town	Source	(Parts per Million)											pH	No. of Samples
		Color	Residue on Evaporation	Ammonia		Nitrogen as		Chlorides	Hardness	Alkalinity	Fe	Mn		
				Free	Total Albu-minoid	Nitrates	Nitrites							
Acton (West and South Water Supply District)	Tubular wells	1	82	.006	.011	1.3	.000	4.7	38	24	.04	–	6.2	4
Amesbury	Tubular wells	20	135	.076	.033	.11	.004	5.8	60	55	4.4	.44	6.7	4
	Tubular wells, filtered	11	124	.002	.019	.10	.000	5.6	64	52	.15	.03	7.3	4
Ashland	New tubular wells	13	65	.023	.044	.15	.000	5.6	26	20	.71	–	6.1	4
ATTLEBORO	Dug wells and filtered water (South Attleboro)	3	65	.003	.024	.29	.000	4.6	34	29	.05	–	7.1	4
	Gravel-packed wells (South Attleboro)	1	48	.004	.021	.15	.000	4.3	24	18	.05	.06	6.0	4
Auburn (Water Co.)	Tubular wells	0	111	.004	.010	1.28	.000	8.7	59	42	.05	–	6.3	5
Avon	Dug and tubular wells	2	68	.008	.023	2.56	.000	6.6	26	11	.04	–	5.7	4
Ayer	Dug well	1	102	.004	.010	3.8	.000	9.3	39	21	.05	–	6.1	4
	Tubular wells	5	81	.015	.010	.20	.000	4.7	42	45	.41	.40	6.5	5
Barnstable (Water Co.)	Tubular wells (old supply)	5	50	.010	.010	.11	.000	11.3	8	9	.23	–	5.6	4
(Fire District)	Tap in town (Yarmouth Water Supply)	2	45	.003	.007	.10	.000	13.5	10	11	.07	–	5.8	4
(Cotuit Fire and Water District)	Gravel-packed wells	1	35	.005	.017	.11	.000	9.0	5	7	.14	–	5.6	4
(Centerville-Osterville Fire District	Tubular wells	3	37	.008	.009	.47	.000	9.9	8	8	.12	–	5.5	4
	Gravel-packed wells	0	38	.005	.009	.09	.000	10.3	5	9	.04	–	5.7	4
Barre	Gravel-packed well	3	42	.005	.007	.15	.000	2.8	12	12	.40	–	5.8	4
Bedford	Dug well	6	41	.012	.022	.44	.000	4.6	18	13	.17	–	6.1	4
	Tubular wells	1	58	.006	.017	.36	.000	5.8	20	17	.10	–	6.0	4
Belchertown (Water District)	Tubular wells	1	70	.011	.009	.95	.000	6.2	35	22	.43	–	6.2	4
Bellingham	Gravel-packed well No 1	1	45	.003	.005	.12	.000	3.2	20	21	.16	.04	6.5	4
	Gravel-packed well No. 2	1	50	.006	.015	.11	.000	3.1	22	21	.12	.03	6.5	4
Bernardston (Fire and Water District)	Dug well	1	30	.005	.011	.17	.000	1.6	13	11	.04	–	6.3	4
Billerica	Gravel-packed wells—tap in pumping station	30	96	.127	.090	.15	.000	10.8	31	23	.59	.54	6.5	4
Bourne														
(Bourne Water District)														
(Monument Beach)	Gravel-packed wells	0	36	.001	.003	.09	.000	7.5	10	10	.06	–	5.9	5
(Buzzards Bay Water District)	Tubular wells	0	36	.002	.004	.09	.000	7.5	5	9	.05	–	6.6	4
(Sagamore—Ware Tenement Supply)	Tubular wells	0	61	.003	.007	.70	.000	10.5	12	11	.04	.04	5.8	2
(Sagamore—Keith Block	Tubular wells	3	46	.001	.009	1.5	.000	10.3	18	18	1.03	.04	6.0	2
(Sagamore—Knowlton Property)	Tubular wells	3	50	.005	.002	.10	.000	8.7	9	13	.63	.02	6.5	2

(Sagamore—Savery Supply)	Tubular wells	0	43	.000	.003	.10	.000	9.7	7	14	.18	.01	6.1	2
(Sagamore Beach)	Tubular wells	4	61	.001	.004	.23	.003	16.8	18	14	.20	–	6.1	2
(Sagamore Heights)	Tubular wells	5	57	.002	.020	.11	.000	13.2	11	11	.50	–	5.6	2
Bridgewater	Tubular wells	1	66	.013	.009	1.8	.000	6.8	21	12	.13	–	5.9	4
Brookline	Tubular wells, gravel-packed wells, and filter gallery, raw water	52	110	.079	.073	.52	.003	9.2	52	48	1.3	.53	6.4	6
	Tubular wells, gravel-packed wells, and filter gallery, filtered	16	105	.005	.053	.44	.000	9.7	51	46	.36	.04	7.1	6
Canton	Henry's Spring well	1	60	.003	.011	.83	.000	7.3	24	14	.04	–	5.8	3
	Ward well	16	84	.012	.037	.50	.000	6.5	26	28	.14	–	6.2	4
	Springdale well	11	76	.002	.029	.43	.000	6.1	25	25	.19	.05	–	4
Chatham (Water Co.)	Tubular wells	0	46	.000	.009	.08	.000	13.1	8	8	.06	–	5.5	3
Chelmsford (North Chelmsford Fire District)	Tubular wells	22	54	.174	.083	.23	.001	4.1	21	26	.55	–	6.3	5
(Water District)	Tubular wells	2	84	.020	.030	.87	.001	5.6	34	25	.07	.14	6.2	3
Cohasset (Water Co.)	Raw water at filter plant	90	73	.047	.190	.16	.000	12.2	21	14	1.02	.10	5.8	4
	Filtered water	7	107	.034	.054	.13	.001	13.1	49	24	.06	.09	7.7	4
Colrain (Griswoldville)	Deep tubular well	0	81	.002	.014	.60	.000	3.0	57	47	.04	–	6.9	2
Colrain (Lyonsville)	Spring	1	64	.000	.002	.11	.000	1.2	42	39	.12	–	6.7	2
	Deep tubular well	0	175	.001	.002	.12	.000	2.0	76	81	.03	–	7.7	2
Cummington	Springs	1	48	.000	.002	1.8	.000	3.6	23	18	.04	.03	6.0	2
Dedham (Water Co.)	Dug and tubular wells	14	104	.032	.047	.93	.000	10.4	43	32	.18	–	6.3	4
Deerfield (Fire District)	North Springs	1	49	.003	.009	.10	.000	3.5	26	18	.04	–	6.2	3
	Harris Springs	1	60	.001	.008	2.0	.000	2.2	31	18	.04	–	6.7	3
	South Springs	2	39	.004	.010	.30	.000	1.6	22	14	.07	–	6.5	3
Douglas	Tubular wells	0	46	.006	.009	.70	.000	4.0	24	18	.04	–	6.0	4
Dover	Tubular wells	1	108	.051	.009	1.00	.030	12.0	47	38	.09	–	6.6	2
Dracut (Water Supply District)	Tubular wells, Dracut	13	121	.015	.037	1.8	.001	8.0	58	39	.53	.04	6.5	2
Dudley	Tubular wells	0	42	.006	.009	.12	.000	3.2	18	14	.05	–	6.0	3
Dunstable	Tubular wells	1	62	.005	.007	1.07	.000	2.9	25	20	.07	–	6.2	3
Duxbury (Fire and Water District)	Tubular wells	0	49	.004	.007	.27	.000	9.7	12	11	.04	–	5.8	3
East Brookfield	Well	0	33	.006	.018	.14	.000	2.4	12	11	.11	–	5.8	3
Easthampton	Tubular wells	0	79	.006	.006	.47	.000	2.5	43	47	.04	–	7.9	3
Easton (North Easton Village District)	Dug well	1	53	.004	.024	.74	.000	5.7	22	13	.05	.02	5.7	6
Easton (Unionville Fire and Water District)	North Easton Village District Water Supply													
Edgartown (Water Co.)	Dug and tubular wells	1	28	.007	.007	.11	.000	9.3	4	7	.04	.02	5.6	4
Fairhaven (Water Co.)	Tubular wells near Nasketucket River	32	71	.015	.079	.62	.001	9.9	24	17	.44	.12	5.7	6
	Tubular wells near Mattapoisett River	2	81	.005	.017	1.08	.000	16.9	24	13	.07	.11	5.7	6
Foxborough	Tubular wells	4	56	.003	.017	.60	.000	4.4	21	18	.11	–	6.1	3
Framingham	Gravel-packed well No. 1	6	95	.031	.016	.11	.000	8.7	51	45	.23	–	7.0	4
	Gravel-packed well No. 2	6	92	.042	.012	.20	.000	7.6	45	40	.96	–	6.6	4
	Gravel-packed well No. 3	1	90	.013	.012	.34	.001	6.9	41	31	.16	–	6.6	4
Franklin	Tubular wells	8	47	.011	.013	.30	.000	4.5	19	19	.48	–	6.1	3
Georgetown	Tubular wells (raw water)	8	60	.007	.005	.25	.002	3.9	23	19	.62	.02	6.1	4
	Tubular wells, filtered	2	56	.006	.007	.18	.000	3.8	25	19	.14	.03	6.5	4
Gill (Riverside Water Co.)	Spring	0	71	.001	.008	1.4	.000	2.5	37	30	.03	–	6.7	2

Averages of Chemical Analyses of Ground Water Sources, etc.— Continued

CITY OR TOWN	SOURCE	(Parts per Million)											pH	No. of Samples
		Color	Residue on Evaporation	AMMONIA		NITROGEN AS		Chlorides	Hardness	Alkalinity	Fe	Mn		
				Free	Total Albuminoid	Nitrates	Nitrites							
Gosnold	Well	2	416	.001	.020	2.5	.000	189.0	99	16	.04	–	5.9	3
Grafton (Water Co.)	Gravel-packed well at North Grafton	1	66	.000	.006	.55	.000	6.0	27	23	.05	–	6.0	2
	Dug wells at Grafton	6	109	.002	.021	5.3	.000	12.7	45	26	.11	–	6.2	4
(Sandersville Supply)	Springs	1	63	.009	.013	1.74	.000	6.5	27	17	.05	–	6.0	4
(Fisherville Supply)	Springs and deep tubular wells	3	86	.348	.029	.75	.002	8.5	27	33	.70	–	6.3	4
Granville (Water Co.)	Well and springs	0	28	.003	.012	.10	.000	1.4	11	13	.08	–	6.2	3
Great Barrington (Fire District)	New infiltration gallery near Green River	0	100	.001	.006	.20	.000	1.5	93	85	.04	–	7.2	4
Greenfield	Dug well near Green River	5	71	.001	.009	.13	.000	1.5	41	39	.13	–	7.2	2
Groton (Water Co.)	Dug well	3	74	.062	.037	.14	.000	2.7	47	48	.13	–	6.6	3
Groton (West Groton Water Supply District)	Tubular wells	0	57	.007	.010	.78	.001	3.3	32	29	.23	.02	6.3	4
Hamilton	Gravel-packed and tubular wells	1	99	.004	.006	.75	.000	16.9	42	30	.09	.02	6.2	6
Hanover	Tubular wells	8	69	.001	.009	.24	.000	7.5	25	20	.18	–	5.9	4
Hardwick (Center)	Dug well	1	58	.003	.011	.17	.000	2.2	22	23	.50	–	6.6	3
Hardwick (Gilbertville)	Dug and tubular wells	0	78	.001	.014	.11	.000	2.0	46	38	.09	–	6.9	4
Hardwick (Wheelwright)	Tubular wells	1	38	.012	.005	.40	.000	2.7	11	12	.07	–	5.8	3
Harwich	Gravel-packed wells	0	52	.004	.004	.32	.000	13.5	12	11	.05	–	5.9	4
Hingham (Water Co.)	Filter galleries	12	84	.004	.030	.40	–	8.0	40	39	.08	–	8.7	6
Holliston (Water Co.)	Gravel-packed well	2	52	.001	.016	.51	.000	3.4	23	19	.26	–	6.3	5
Hopedale	Milford Water Supply													
Hopkinton	Tubular wells	0	49	.009	.015	1.3	.000	3.5	26	20	.04	–	6.3	3
Hull	Hingham Water Supply													
Huntington (Fire District)	Tubular wells	1	62	.003	.010	.22	.000	2.9	28	20	.03	–	6.1	3
Kingston	Tubular wells	0	45	.008	.005	.15	.000	7.1	12	13	.05	–	6.1	3
Lanesborough (Village Water District)	Tubular wells	1	213	.002	.009	.22	.001	1.5	193	192	.28	–	7.5	4
Leicester (Water Supply District)	Dug wells	6	67	.007	.019	.70	.000	3.0	31	24	.10	–	6.6	3
Leicester (Cherry Valley and Rochdale Water District)	Dug wells	21	45	.012	.137	.15	.000	3.8	20	17	.12	–	6.4	3
Littleton	Tubular wells	0	41	.003	.005	.27	.000	2.5	20	15	.04	–	6.1	3
LOWELL	Boulevard wells, raw water	–	68	.322	.065	.20	.001	5.4	25	30	3.5	.65	6.3	2
	Cook wells	33	102	.009	.035	.388	.000	9.2	43	31	1.7	.43	6.1	4
	Effluent of sand filter	17	56	.012	.024	.314	.001	5.0	25	24	.44	.02	6.3	5
Lynnfield (Lynnfield Center Water District)	Tubular wells	1	98	.002	.006	.90	.000	6.0	91	62	.06	.02	7.3	10
Manchester	Dug and tubular wells	4	163	.003	.009	1.07	.001	17.4	47	70	.13	–	6.9	4
Mansfield	Dug well	0	42	.004	.008	.18	.000	3.8	17	11	.05	–	5.8	4

Marblehead	Tubular wells	33	213	.031	.133	.12	.001	12.3	136	102	.22	.20	7.0	4
	Dug well	3	176	.036	.013	.13	.002	16.1	86	46	.86	.16	6.5	4
	Dug and tubular wells, filtered	17	126	.002	.099	.13	.000	14.7	66	39	.17	.04	6.9	4
Marion	Old tubular wells	1	47	.002	.010	.36	.000	7.0	15	11	.03	–	5.7	2
	New tubular wells.	0	100	.002	.004	.25	.000	20.2	39	32	.07	–	6.5	2
Marshfield Main Supply	Tubular wells	1	46	.002	007	20	.000	8.8	15	14	.04	–	6.3	4
Parsonage Street wells	Tubular wells	5	109	.003	.007	.60	.000	28.4	33	16	.28	–	5.9	4
Brant Rock wells	Dug wells	0	69	.003	.007	.10	.000	18.6	14	10	.16	–	5.9	2
Humarock Beach Supply	Tubular wells	2	83	.001	.014	.20	.000	19.7	20	16	.43	–	5.8	3
Mattapoisett	Tubular wells	4	58	.007	.008	.63	.001	8.3	23	18	.14	–	6.0	3
Medfield	Tubular wells, tap in town (supplied from State Hospital)	1	87	.008	.014	.22	.000	4.3	45	46	.07	.02	7.3	5
Medway	Tubular wells	5	87	.022	.016	.72	.001	9.5	35	34	.20	–	6.4	5
Merrimac	Tubular wells	2	66	.003	.009	.15	.000	6.2	32	18	.03	–	5.9	3
Methuen	Gravel-packed well	26	95	.021	.020	1.4	.000	9.3	40	28	.93	.20	6.1	3
	Lone Tree Hill wells	34	97	.392	.066	.41	.001	7.6	48	51	1.38	2.2	6.6	4
Middleborough	Dug well	35	71	.110	.053	.46	.001	6.6	27	25	3.0	.73	6.0	4
	Final effluent (dug well filtered)	10	64	.004	.016	.58	.000	6.7	27	22	.17	.03	6.5	4
Milford (Milford Water Co.)	Outlets of filters	17	51	.029	.043	.13	.000	3.8	30	23	.18	–	7.6	4
Millbury (Water Co.)	Dug well	0	49	.005	.017	.63	.000	4.0	25	14	.03	–	5.5	3
Millis.	Dug wells	1	133	.004	.010	3.4	.000	10.6	70	37	.11	–	6.5	4
Monson	Old dug well	28	38	.007	.067	.14	.000	1.9	10	13	.10	–	6.5	4
	New dug well	1	34	.007	.023	.14	.000	2.1	9	13	.03	–	6.2	4
Montague (Montague Village)	Springs	6	53	.003	.035	.27	.000	1.6	23	23	.11	–	6.9	3
Nantucket (Wannacomet Water Company	Dug and tubular wells at Wyers Valley	1	63	.003	.006	.20	.000	17.5	22	16	.05	–	6.4	4
Nantucket (Siasconset)	Dug wells	0	66	.003	.009	.24	.000	16.9	23	17	.06	–	6.1	3
Natick	Dug well	1	119	.007	.014	.68	.000	11.4	60	49	.18	.03	6.9	4
Needham	Dug well No. 1	1	116	.001	.022	5.7	.000	9.4	42	16	.05	–	5.9	4
	Dug well No. 2	0	110	.002	.013	4.4	.001	9.0	43	21	.03	–	6.0	4
	Tubular wells (Great Plain Avenue)	5	121	.005	.017	1.1	.000	8.7	39	57	.27	–	6.3	4
	Gravel-packed well (Charles River Street)	0	101	.002	.013	.70	.000	7.9	52	48	.03	–	7.1	5
NEWTON	Tap in pumping station (treated water)	6	134	.057	.026	.44	.000	9.5	38	81	.16	.14	7.3	5
	Dug well No. 1	2	96	.005	.012	1.18	.001	8.1	42	36	.04	.03	6.3	5
	Dug well No. 2	2	91	.003	.017	.26	.000	8.6	45	38	.04	.02	6.3	5
	Dug well No. 3	1	90	.005	.018	.22	.000	9.5	43	36	.03	.02	6.3	5
	Dug well No. 4	2	98	.004	.018	.20	.000	8.2	50	20	.03	.02	6.3	5
North Attleborough	Dug wells	11	90	.007	.023	.48	.000	5.1	43	45	.51	.06	7.3	3
Northbridge	Tubular wells (Meadow Pond)	0	36	.003	.013	.22	.000	3.9	18	17	.04	–	5.9	2
	Tubular wells (Cook Allen)	1	32	.004	.033	.07	.000	2.4	13	9	.03	–	5.8	2
North Reading	Tap in town (Wilmington Supply)	0	71	.005	.007	.21	.000	4.3	28	24	.04	–	6.3	3
Norton	Tubular wells	2	51	.003	.009	.10	.000	3.6	17	17	.19	–	6 1	3
Norwood	Tubular wells													
	Raw water	12	105	.007	.017	.92	.000	9.2	46	28	.30	.09	6.5	4
	Final Effluent	1	98	.002	.015	.81	.000	9.6	48	28	.04	.02	6.7	4
Oak Bluffs (Cottage City Water Company	Springs	0	35	.003	.005	.10	.000	8.6	8	11	.08	–	6.0	2

Averages of Chemical Analyses of Ground-Water Sources, etc.— Concluded

City or Town	Source	(Parts per Million)											pH	No. of Samples
		Color	Residue on Evaporation	Ammonia		Nitrogen as		Chlorides	Hardness	Alkalinity	Fe	Mn		
				Free	Total Albuminoid	Nitrates	Nitrites							
Orange	Crystal Spring	8	32	.013	.027	.10	–	1.5	13	12	.07	–	6.2	3
Oxford (Water Co.)	Tubular wells	0	54	.005	.007	.57	.000	3.8	23	19	.05	–	6.2	3
Palmer (Three Rivers)	Cheney Supply collecting well	1	47	.006	.010	.11	.000	1.9	19	21	.05	–	6.8	2
(Bondsville Water Co.)	Tubular wells	0	61	.003	.009	.53	.000	3.1	25	19	.28	–	6.4	3
Paxton	Spring	3	31	.008	.017	.10	.000	2.3	16	15	.07	–	6.4	4
Pepperell	Tubular wells	0	41	.003	.015	.16	.000	2.0	15	15	.03	–	6.1	3
Provincetown	Tubular wells	1	174	.008	.007	.11	.000	70.	40	13	.06	.04	6.2	6
Reading	New tubular wells	17	107	.024	.038	.28	.000	10.	50	31	.06	.20	6.1	4
	New tubular wells, filtered	7	102	.003	.026	.30	.000	10.3	46	29	.16	.03	7.0	4
Rockport	Tubular wells	2	81	.003	.017	.43	.000	16.6	29	21	.06	.03	6.2	5
Salisbury (Water Supply Company)	New dug well	14	105	.003	.006	.13	.000	6.6	57	55	.75	–	7.0	3
	Gravel-packed well	12	102	.008	.006	.06	.000	6.8	59	54	.70	–	6.9	1
Scituate	Webster Meadow wells	0	129	.002	.010	.77	.000	21.3	53	41	.06	–	6.8	9
	Beaver Dam wells	1	148	.005	.010	3.0	000	25.0	51	31	.15	–	6.4	2
	Kent Street wells	1	621	.001	.008	.25	.000	252.	86	22	.31	–	6.4	2
Sharon	Dug well and tubular wells	0	199	.001	.008	5.8	.000	31.3	94	60	.05	–	6.5	4
	Tubular wells	5	72	.004	.010	1.5	.000	7.2	28	24	.17	–	6.3	4
Sheffield (Water Co.)	Smith Spring	1	37	.005	.005	.13	.000	1.3	20	22	.04	–	6.2	3
	Farm House Spring	1	40	.005	.007	.13	.000	1.3	21	23	.07	–	6.3	3
	Red Rock Spring	0	40	.004	.005	.13	.000	1.2	21	23	.04	–	6.4	3
Shirley (Shirley Village Water District)	Dug wells	3	79	.010	.013	2.00	.000	6.0	30	15	.17	–	6.1	2
Shrewsbury	Gravel-packed wells (South Street)	1	56	.000	.013	.38	.002	6.8	25	19	.04	.01	5.9	3
	Gravel-packed wells (Oak Street)	0	64	.000	.010	.37	.000	4.8	27	22	.03	–	6.2	3
Somerset	Tubular wells	27	151	.005	.033	.15	.000	6.7	28	89	.70	–	7.7	4
South Hadley (Fire District No. 2)	Dug wells	3	62	.009	.014	.22	.000	4.6	31	25	.04	–	6.7	3
Sterling	Tubular wells	1	68	.001	.005	.43	.000	3.8	42	37	.06	–	6.6	4
Stockbridge (Hill Water Co.)	Springs	1	71	.003	.019	.10	.000	1.3	45	49	.12	–	7.2	2
Stoughton	Collecting gallery system	2	38	.008	.015	.14	.000	3.7	10	10	.04	.03	5.6	6
Sturbridge	Tubular wells	11	68	.004	.004	.25	.000	4.3	27	23	1.41	–	6.3	4
Sudbury	Tubular wells	2	61	.004	.005	.13	.000	3.3	30	28	.09	–	6.8	3
Sutton (Water Co.)	Dug and tubular wells	4	125	.011	.013	3.1	.000	4.9	58	49	.26	–	7.0	4
Tisbury	Tashmoo Spring	1	45	.009	.010	.11	.000	11.7	7	11	.04	.02	5.9	4
Topsfield (Topsfield Water Co., Inc.)	Dug and tubular wells	3	183	.020	.013	.44	.000	12.5	115	106	.19	–	7.2	4
Townsend	Tubular wells	0	31	.001	.004	.20	.000	2.6	10	11	.03	–	5.7	4
Upton (West Upton)	Tubular wells	0	81	.010	.009	1.00	.000	6.1	33	18	.09	–	5.9	4
Uxbridge	Tubular wells, new system	3	64	.010	.010	1.53	.000	5.3	23	17	.53	–	5.9	3

Wakefield	Tubular wells	0	143	.008	.006	1.9	.000	21.4	50	28	.06	–	6.2	2
Walpole	Tubular wells	0	59	.006	.017	.68	.000	4.9	26	21	.05	–	6.2	3
WALTHAM	Old dug well	17	102	.076	.028	.20	.001	9.4	47	51	1.19	.65	6.4	5
	New dug well	1	80	.001	.015	.45	.000	7.9	40	31	.04	.05	6.3	5
Ware	Large well, treated	0	69	.006	.010	1.04	.000	3.8	28	22	.05	–	6.2	4
Wareham (Wareham Fire District)	Tubular wells	1	35	.006	.009	.16	.000	6.2	10	11	.09	–	5.6	4
Warren (Warren Water District)	Tubular wells	0	38	.006	.007	.28	.000	2.9	14	14	.05	–	6.0	3
(West Warren Water Co.)	Dug wells	1	48	.000	.003	1.61	.000	1.8	21	16	.04	–	6.1	2
Wayland	Gravel-packed and tubular wells	6	108	.011	.013	.67	.001	6.3	47	30	.57	–	6.5	3
Webster	Tubular wells	1	42	.009	.010	.30	.000	3.4	20	20	.06	–	6.3	4
Wellesley	Tubular wells at pumping station No. 1	0	85	.004	.011	.77	.000	8.3	42	36	.04	–	6.3	3
	Dug well at pumping station No. 2	1	79	.003	.003	.87	.000	6.9	38	27	.06	–	6.3	3
	Large tubular well at pumping station No. 3	3	84	.001	.003	.83	.000	5.8	39	24	.35	–	6.2	3
	Gravel-packed well at pumping station No. 4	1	83	.013	.013	.24	.000	6.3	40	35	.06	–	6.6	3
Westborough	Filter basin	8	31	.010	.094	.07	.000	3.0	12	10	.07	–	6.5	4
West Brookfield	Tubular wells	1	43	.007	.006	.18	.000	2.9	13	9	.07	–	5.6	3
Westford (Water Co.)	Tubular wells (Westford)	0	50	.003	.007	.20	.000	2.3	24	27	.06	–	6.7	3
(Abbot Worsted Company)	Tubular wells	0	87	.007	.008	.47	.000	3.6	37	29	.04	–	6.3	3
Weston	Tubular wells at Warren Avenue	3	91	.010	.019	1.60	.000	7.5	47	30	.12	–	6.3	4
	Tubular wells at Kendall Green	1	77	.006	.014	.78	.000	6.1	34	24	.12	–	6.3	4
(Keewaydin Water Works)	Dug well	2	73	.004	.018	.52	.000	5.2	33	20	.05	.02	6.1	11
(Water Company)	Dug well A	3	65	.000	.016	.12	.000	5.2	39	26	.03	–	6.2	1
	Dug well C	12	86	.010	.045	.35	.000	7.3	38	28	.35	–	6.1	2
(Glen Farms Water Co.)	Dug well	4	114	.024	.019	2.18	.000	8.1	56	34	.16	–	6.6	2
(R. B. Rand Supply)	Dug well	3	85	.008	.007	2.47	.000	5.9	37	19	.58	.02	6.3	3
West Stockbridge (East Mountain Water Co.)	Johnson's Spring	0	136	.002	.003	.15	.000	2.2	104	100	.05	–	7.0	2
	Blake's Spring	2	140	.002	.026	.20	.000	1.0	123	118	.03	–	7.5	1
	Sartori Spring	0	169	.000	.002	.20	.000	1.3	160	153	.05	–	7.5	2
Westwood	Dedham Water Supply													
(Water Company)	Tubular wells	0	80	.000	.008	2.0	.000	7.6	39	22	.05	–	6.1	1
Whately (Craft Supply)	Springs	5	151	.001	.008	8.5	.000	7.8	73	43	.24	–	6.8	2
Williamstown (Water Co.)	Cold Spring	0	138	.004	.008	.31	.000	1.1	149	125	.04	–	7.5	3
	Sherman Spring	3	76	.012	.051	.09	.000	1.1	62	58	.05	–	7.5	3
Wilmington	Tubular wells	0	64	.000	.016	.35	.000	4.4	27	24	.05	–	6.3	4
Winchendon	Old dug well	24	48	.052	.037	.12	.001	1.7	16	13	3.2	–	5.5	4
	New dug well	17	32	.011	.038	.18	.001	1.7	11	9	.28	–	5.4	4
Winchester	Pond Street wells	2	241	.004	.015	.68	.000	43.7	113	69	.04	–	6.7	4
WOBURN	Dug well	3	109	.014	.075	.34	.002	13.3	52	39	.15	–	6.7	4
	Gravel-packed well A	3	112	.002	.039	.34	.001	14.2	53	38	.14	–	6.6	4
	Gravel-packed well A-2	1	117	.030	.022	.21	.000	11.6	62	54	.04	–	6.9	4
	Gravel-packed well B	0	106	.012	.022	.19	.000	11.2	52	41	.05	–	6.7	4
	Gravel-packed well D	1	84	.005	.013	.16	.000	9.9	41	28	.04	–	6.3	4
	Gravel-packed well E	1	124	.001	.012	3.9	.000	13.7	56	24	.04	–	6.2	4
Worthington (Fire District)	Springs	9	35	.001	.020	.10	.000	1.3	18	15	.16		6.5	2
Wrentham	Large tubular wells	0	77	.007	.009	3.3	.000	5.0	33	15	.06	–	6.0	3
Yarmouth	Tubular wells	0	51	.006	.007	.10	.000	13.5	8	9	.04	–	5.6	3

The following table shows the normal rainfall as deduced from the records of seven long-term stations located at Amherst, Boston, Dalton, Fitchburg, Lowell, New Bedford and Northbridge; also the rainfall for the year 1941 and the excess or deficiency for each month as compared with the normal.

MONTH	Normal Rainfall (inches)	Rainfall in 1941 (inches)	Excess or Deficiency in 1941 (inches)
January	3.59	3.17	—0.42
February	3.35	2.25	—1.10
March	3.81	2.34	—1.47
April	3.59	1.21	—2.38
May	3.52	2.80	—0.72
June	3.48	4.11	+0.63
July	3.80	4.27	+0.47
August	4.15	3.69	—0.46
September	3.60	0.96	—2.64
October	3.51	2.23	—1.28
November	3.75	2.91	—0.84
December	3.55	3.73	+0.18
Totals	43.70	33.67	—10.03

Table Showing the Average Yield of the Sudbury River for Each Month in the Year 1941, in Cubic Feet per Second per Square Mile of Drainage Area, and in Million Gallons per Day per Square Mile of Drainage Area; also Departure from the Normal.

MONTH	NORMAL YIELD		ACTUAL YIELD IN 1941		EXCESS OR DEFICIENCY	
	Cubic Feet per Second per Square Mile	Million Gallons per Day per Square Mile	Cubic Feet per Second per Square Mile	Million Gallons per Day per Square Mile	Cubic Feet per Second per Square Mile	Million Gallons per Day per Square Mile
January	1.768	1.142	1.139	0.736	—0.629	—0.406
February	2.273	1.469	2.103	1.359	—0.170	—0.110
March	4.103	2.652	2.093	1.353	—2.010	—1.299
April	3.141	2.030	1.586	1.025	—1.555	—1.005
May	1.659	1.072	0.545	0.352	—1.114	—0.720
June	0.817	0.528	0.254	0.164	—0.563	—0.364
July	0.360	0.233	—0.077	—0.050	—0.437	—0.283
August	0.309	0.200	—0.364	—0.235	—0.673	—0.435
September	0.436	0.281	—0.376	—0.243	—0.812	—0.524
October	0.593	0.383	—0.324	—0.210	—0.916	—0.593
November	1.179	0.762	0.023	0.015	—1.156	—0.747
December	1.512	0.977	0.287	0.185	—1.225	—0.792
Average for whole year	1.508	0.975	0.564	0.364	—0.944	—0.611

The rainfall on the Sudbury River watershed and the total yield expressed in inches in depth (inches of rainfall collected) for each of the past six years 1936 to 1941, inclusive, together with the average for 67 years are given in the following table:

Table Showing the Average Yield of the Nashua River for Each Month in the Year 1941, in Cubic Feet per Second per Square Mile of Drainage Area, and in Million Gallons per Day per Square Mile of Drainage Area; also Departure from the Normal.

MONTH	NORMAL YIELD		ACTUAL YIELD IN 1941		EXCESS OR DEFICIENCY	
	Cubic Feet per Second per Square Mile	Million Gallons per Day per Square Mile	Cubic Feet per Second per Square Mile	Million Gallons per Day per Square Mile	Cubic Feet per Second per Square Mile	Million Gallons per Day per Square Mile
January	1.913	1.237	1.221	0.789	—0.692	—0.448
February	1.986	1.283	1.846	1.193	—0.140	—0.090
March	3.943	2.548	1.760	1.138	—2.183	—1.410
April	3.654	2.361	2.105	1.361	—1.549	—1.000
May	1.997	1.291	1.078	0.697	—0.919	—0.594
June	1.288	0.832	0.625	0.404	—0.663	—0.428
July	0.758	0.490	0.475	0.307	—0.283	—0.183
August	0.626	0.405	0.470	0.304	—0.156	—0.101
September	0.729	0.471	—0.018	—0.012	—0.747	—0.483
October	0.740	0.478	—0.482	—0.312	—1.222	—0.790
November	1.274	0.823	0.473	0.306	—0.801	—0.517
December	1.761	1.138	0.737	0.476	—1.024	—0.662
Average for whole year	1.720	1.112	0.850	0.549	—0.870	—0.563

Flow of the Merrimack River at Lawrence in Cubic Feet per Second per Square Mile

MONTH	1936	1937	1938	1939	1940	1941	Mean for sixty-two years, 1880–1941
January	1.687	2.620	2.117	1.760	.481	1.571	1.332
February	1.413	2.475	2.416	1.527	.486	1.874	1.373
March	10.408	2.067	2.467	2.403	1.143	1.441	2.755
April	4.477	3.679	2.884	5.691	6.314	2.356	3.676
May	1.867	4.289	1.862	2.735	4.182	.952	2.260
June	.705	2.104	1.310	1.016	2.430	.539	1.269
July	.478	.969	2.039	.489	.940	.536	.772
August	.359	.575	1.898	.508	.520	.294	.645
September	.411	.521	4.156	.367	.709	.267	.695
October	.889	.827	1.894	.399	.407	.326	.796
November	.969	2.083	1.640	.849	1.488	.529	1.153
December	2.306	2.679	3.309	.688	1.335	.594	1.158
Average for whole year	2.164	2.074	2.333	1.536	1.703	.940	1.490
Average for driest six months	.635	1.180	2.077	.550	.900	.415	.870

Weekly Flow of the Sudbury, Nashua and Merrimack Rivers

The following table shows the weekly fluctuations during the year 1941 in the yield of the Sudbury River at Framingham, the South Branch of the Nashua River at the outlet of the Wachusett Reservoir in Clinton and the Merrimack River at Lawrence. The flow of these streams, particularly that of the Sudbury River and the South Branch of the Nashua River, serves to indicate the flow of other streams in eastern Massachusetts. The area of the Sudbury River watershed is 75.2 square miles, of the South Branch of the Nashua River 107.69 square miles and of the Merrimack River at Lawrence 4,463 square miles.

Table Showing the Average Weekly Flow of the Sudbury, South Branch of the Nashua and the Merrimack Rivers for the Year 1941, in Cubic Feet per Second per Square Mile of Drainage Area

WEEK ENDING SUNDAY	Yield of Sudbury River	Yield of South Branch Nashua River	Flow of Merrimack River	WEEK ENDING SUNDAY	Yield of Sudbury River	Yield of South Branch Nashua River	Flow of Merrimack River
Jan. 5	2.413	2.145	2.710	July 6	0.056	0.284	0.311
12	0.906	1.072	1.637	13	0.014	0.391	0.518
19	1.002	1.035	1.327	20	—0.129	0.445	0.698
26	1.098	1.205	1.218	27	—0.769	0.396	0.578
Feb. 2	0.777	0.977	1.160	Aug. 3	0.009	0.863	0.490
9	1.918	2.632	1.460	10	—0.703	0.410	0.367
16	2.962	2.404	2.806	17	—0.887	0.448	0.220
23	1.716	1.371	1.855	24	0.584	0.398	0.286
Mar. 2	1.176	0.955	1.441	31	—0.147	0.608	0.273
9	1.568	1.566	1.348	Sept. 7	—0.036	0.289	0.279
16	1.294	1.340	1.279	14	—0.448	0.306	0.295
23	1.559	1.301	1.285	21	—0.462	—0.170	0.270
30	3.993	2.948	1.814	28	—0.402	—0.366	0.227
Apr. 6	2.779	3.426	2.262	Oct. 5	—0.216	—0.438	0.212
13	1.999	2.647	2.862	12	—0.913	—0.528	0.302
20	1.231	1.702	2.825	19	—0.199	—0.606	0.424
27	1.061	1.247	1.822	26	—0.520	—0.714	0.329
May 4	0.652	1.152	1.230	Nov. 2	0.725	0.573	0.305
11	1.151	1.626	1.150	9	0.092	0.629	0.817
18	0.726	1.126	1.197	16	—0.108	0.237	0.613
25	0.191	0.872	0.725	23	—0.143	0.342	0.377
June 1	—0.061	0.474	0.618	30	—0.186	0.258	0.402
8	0.407	1.118	0.573	Dec. 7	0.027	0.438	0.338
15	0.183	0.450	0.470	14	0.395	0.904	0.363
22	0.335	0.553	0.680	21	0.234	0.737	0.491
29	—0.007	0.447	0.451	28	0.573	0.907	0.903

TABLE 6.— *Efficiency of Sand Filters (Per Cent Removal)*

Parts per Million and Per Cent

CITY OR TOWN	FREE AMMONIA			TOTAL ALBUMINOID AMMONIA			KJELDAHL NITROGEN			CHLORIDES		B. O. D.		
	Applied Sewage	Effluent	Per Cent Removal	Applied Sewage	Effluent	Per Cent Removal	Applied Sewage	Effluent	Per Cent Removal	Applied Sewage	Effluent	Applied Sewage	Effluent	Per Cent Removal
ATTLEBORO	41.6	19.0	54	7.68	1.76	77	16.5	4.1	75	34	34	180	33	82
BROCKTON	51.2	26.5	48	8.15	1.75	79	18.3	4.2	77	91	82	383	40	90
Clinton	19.5	9.1	53	6.46	1.55	76	12.1	3.6	70	52	49	242	52	79
Concord	24.9	3.8	85	9.03	0.18	98	16.6	0.3	98	37	27	150	1	99
Easthampton	34.7	13.0	63	6.37	0.75	88	13.3	1.7	87	39	38	260	3	99
Franklin	22.4	10.1	55	3.09	1.64	47	6.9	3.9	43	24	33	276	2	99
GARDNER (Gardner Area)	38.4	20.3	47	8.35	1.69	80	15.5	4.0	74	47	48	283	13	95
GARDNER (Templeton Area)	52.1	25.8	50	5.27	1.98	62	8.8	3.7	58	46	45	192	46	76
Hopedale	44.7	13.2	70	4.72	0.70	85	9.8	1.4	86	40	32	153	5	97
Hudson	57.0	41.5	27	7.55	2.43	68	15.9	5.2	67	57	53	408	107	74
Leicester	21.1	11.0	48	6.05	1.53	75	14.9	3.0	80	20	24	235	23	90
Lenox	20.3	2.6	87	2.37	0.46	81	5.7	1.0	82	21	23	111	3	97
Marion	11.6	0.1	99	1.47	0.18	88	3.5	0.4	89	128	138	63	1	98
MARLBOROUGH	39.9	16.2	59	7.50	0.80	89	14.2	1.9	87	42	44	290	2	99
Medfield	22.7	10.1	56	7.53	1.66	78	17.0	4.8	72	29	29	232	28	88
Millis	17.7	0.2	99	2.19	0.17	92	5.1	0.7	86	29	28	46	2	96
North Attleborough	15.2	7.3	52	3.89	0.41	89	9.0	0.9	90	25	22	65	7	89
Northbridge	34.6	5.4	84	4.50	1.01	78	9.3	2.8	70	31	25	108	5	95
PITTSFIELD	20.5	7.8	62	3.97	1.01	75	8.8	2.3	74	47	53	148	16	89
Southbridge	51.2	24.6	52	6.65	1.90	71	12.0	3.8	68	46	42	183	5	97
Spencer (new beds)	21.2	11.6	45	6.97	1.17	83	15.7	2.5	84	30	28	195	21	89
Spencer (old beds)	21.2	6.4	70	6.97	0.38	95	15.7	1.1	93	30	28	195	3	98
Stockbridge	19.2	2.5	87	3.41	0.54	84	8.4	2.3	73	16	26	145	3	98
Westborough	34.4	10.6	69	8.33	1.47	82	15.6	3.3	79	74	182	245	15	94
Winchendon	21.9	1.3	94	3.49	0.21	94	8.3	0.6	93	24	27	103	1	99

TABLE No. 7.— *Summary of Efficiency of Sewage Disposal Works (Per Cent Removed from Raw Sewage to Final Effluent)*

Parts per Million and Per Cent

City or Town	Suspended Solids			Free Ammonia			Total Aluminoid Ammonia			Kjeldahl Nitrogen			Chlorides		Oxygen Consumed			B.O.D.		
	Raw Sewage	Final Effluent	Per Cent Removed	Raw Sewage	Final Effluent	Per Cent Removed	Raw Sewage	Final Effluent	Per Cent Removed	Raw Sewage	Final Effluent	Per Cent Removed	Raw Sewage	Final Effluent	Raw Sewage	Final Effluent	Per Cent Removed	Raw Sewage	Final Effluent	Per Cent Removed
Amherst	184	77	58	33.1	34.1	–	7.37	5.29	28	14.3	11.8	17	35	31	65	46	29	263	170	35
ATTLEBORO.	376	23	94	41.6	19.0	54	7.68	1.76	77	16.5	4.1	75	34	34	67	18	73	180	33	82
BROCKTON	266	77	71	52.8	35.6	33	11.35	4.80	58	23.5	10.8	54	88	98	160	78	51	537	47	91
Clinton	283	23	92	20.6	9.1	56	14.65	1.55	89	27.8	3.6	87	84	49	493	37	92	515	52	90
Concord	118	4	97	24.9	3.7	85	9.03	0.18	98	16.6	0.3	98	37	27	74	4	95	150	1	99
Easthampton	142	24	83	40.5	13.0	68	7.97	0.75	91	15.3	1.7	89	39	38	80	11	86	363	3	99
FITCHBURG	193	37	81	25.5	6.3	75	7.33	1.66	77	15.9	3.6	77	30	30	63	16	75	152	17	89
Framingham	274	67	76	53.8	18.6	65	10.30	4.73	54	20.8	7.9	62	41	54	109	39	64	238	42	82
Franklin	189	29	85	33.0	10.1	69	8.90	1.64	82	17.0	3.9	77	37	33	80	13	84	238	2	99
GARDNER (Gardner Area)	192	17	91	38.4	20.3	47	8.35	1.69	80	15.5	4.0	74	47	48	78	17	78	283	13	95
GARDNER (Templeton Area)	226	30	87	66.4	25.8	61	10.95	1.98	82	20.5	3.7	82	53	45	95	19	80	207	46	78
Greenfield	172	102	41	28.6	29.8	–	6.90	4.16	40	14.5	10.1	30	32	30	71	43	39	240	160	33
Hopedale	143	7	95	45.9	13.2	71	6.00	0.70	88	12.7	1.4	89	48	32	69	11	84	235	5	98
Hudson	321	61	81	70.0	41.5	41	12.60	2.43	81	21.2	5.2	75	65	53	112	39	65	345	107	69
Leicester	119	18	85	21.1	11.0	48	6.05	1.53	75	14.9	3.0	80	20	24	72	15	79	235	23	90
Lenox	149	6	96	16.1	2.6	84	4.91	0.46	91	11.4	1.0	91	25	23	56	6	89	141	3	98
LEOMINSTER	176	8	95	29.6	22.8	23	6.38	1.26	80	11.8	2.6	78	31	25	65	12	82	155	19	88
Ludlow	252	79	69	41.8	36.0	14	8.50	5.75	32	20.0	13.5	33	43	38	130	140	–	265	260	2
Mansfield	323	29	91	28.4	9.6	66	9.00	2.33	74	19.0	4.9	74	38	48	110	19	83	287	36	87
Marion	61	14	77	23.7	0.1	100	2.90	0.18	94	6.8	0.4	94	104	138	33	5	85	90	1	99
MARLBOROUGH	283	13	95	49.0	16.2	67	16.92	0.80	95	31.2	1.9	94	73	44	172	9	95	533	2	100
Maynard	536	32	94	50.8	20.9	59	19.87	2.44	88	47.6	7.2	85	55	40	177	21	88	408	20	95
Medfield	127	4	97	22.7	10.1	56	7.53	1.66	78	17.0	4.8	72	29	29	85	17	80	232	28	88
Milford	174	36	79	44.2	10.5	76	7.90	2.68	66	16.3	5.1	69	63	46	94	21	78	173	18	90
Millis	34	28	18	17.7	0.2	99	2.19	0.17	92	5.1	0.7	86	29	28	27	5	81	46	2	96
Natick	676	85	87	32.3	3.3	90	8.70	2.64	70	20.1	6.8	66	54	49	197	61	69	317	27	91
NORTH ADAMS	221	84	62	26.9	22.8	15	6.08	3.73	39	17.0	10.1	41	30	24	72	40	44	210	111	47
North Attleborough	84	7	92	15.4	7.3	53	4.17	0.41	90	11.5	0.9	92	23	22	40	6	85	70	7	90
Northbridge	185	9	95	34.6	5.4	84	6.15	1.01	84	12.0	2.8	77	36	25	74	10	86	170	5	97
PITTSFIELD	196	23	88	25.1	2.9	88	9.65	1.75	82	17.4	3.5	80	60	38	93	20	78	250	17	93
Southbridge	208	47	77	40.4	24.6	39	7.65	1.90	75	15.0	3.8	75	57	42	80	14	83	280	5	98
Spencer (new beds)	172	39	77	21.2	11.6	45	6.97	1.17	83	15.7	2.5	84	30	28	86	15	83	195	21	89
Spencer (old beds)	172	14	92	21.2	6.4	70	6.97	0.38	95	15.7	1.1	93	30	28	86	9	90	195	3	98
SPRINGFIELD (Main plant)	146	75	49	17.2	16.8	2	4.43	3.40	23	10.7	9.3	13	41	39	52	41	21	134	101	25
SPRINGFIELD (Indian Ordhard)	124	54	56	21.0	22.2	–	4.64	3.58	23	11.0	8.1	26	26	26	43	33	23	172	116	33
Stockbridge	75	13	83	19.2	2.5	87	3.41	0.54	84	8.4	2.3	73	16	26	42	7	83	145	3	98
Westborough	187	15	92	34.4	10.6	69	8.33	1.47	82	15.6	3.3	79	74	181	46	26	43	245	15	94
Winchendon	173	13	92	32.8	1.3	96	8.40	0.21	98	17.0	0.6	96	35	27	76	4	95	267	1	100
WORCESTER	389	73	81	23.0	24.8	–	7.12	1.82	74	22.3	4.7	79	100	73	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

City or Town	Population, Census of 1940	Approximate Length of Sanitary Sewers (Miles)	Approximate Number of House Connections	Estimated Quantity of Sewage Treated (Gallons per Day): Average for Year	Average for Month of Maximum Flow	Average for Month of Minimum Flow	Estimated Quantity of Sewage per Connection (Gallons per Day)	Net Area of Filter Beds (Acres)	Estimated Rate of Operation with Even Distribution (Gallons per Acre per Day)
Amherst	6,410	–	–	516,000	753,000	296,000	–	–	–
ATTLEBORO	22,071	38.58	2,004	741,000	1,160,000	543,000	370	15.50	48,000
Barnstable	8,333	–	–	87,000	146,000	62,000	–	4.13	21,000
BROCKTON	62,343	116.80	8,949	3,041,000[1]	3,561,000	2,587,000	340	37.00 *	–
Clinton	12,440	–	1,969	1,257,000[2]	1,738,000	972,000	638	26.23	48,000
Concord	7,972	17.73	841	420,000	586,000	313,000	499	7.41	57,000
Easthampton	10,316	–	–	–	–	–	–	2.20	–
FITCHBURG	41,824	70.99	–	2,930,000	3,740,000	2,410,000	–	– *	–
Foxborough	6,303	–	–	–	–	–	–	–	–
Framingham	23,214	56.01	4,041	1,286,000	2,072,000	958,000	318	– *	–
Franklin	7,303	14.28	883	218,000	258,000	174,000	247	3.24	67,000
GARDNER	20,206	40.42	2,777	–	–	–	–	16.50	–
Greenfield	15,672	40.80	2,885	994,000	1,531,000	637,000	345	–	–
Hopedale	3,113	7.08	371	177,000[3]	234,000	155,000	477	3.79	47,000
Hudson	8,042	14.96	1,195	533,000	570,000	486,000	446	9.00	59,000
Leicester	4,851	–	–	–	–	–	–	0.73	–
Lenox	2,884	10.59	406	–	–	–	–	2.50	–
LEOMINSTER	22,226	–	–	1,936,000	2,906,000	1,552,000	–	– **	–
Ludlow	8,181	25.00	655	–	–	–	–	–	–
Mansfield	6,530	10.19	232	–	–	–	–	– *	–
Marion	2,030	4.84	282	187,000	322,000	60,000	663	1.53	122,000
MARLBOROUGH	15,154	36.9	2,708	1,352,000	1,776,000	1,040,000	499	20.19	67,000
Maynard	6,812	12.80	857	181,000	187,000	176,000	211	– *	–
Medfield	4,384	2.75	151	–	–	–	–	1.61	–
Milford	15,388	26.53	1,946	755,000	985,000	504,000	388	– *	–
Millis	2,278	1.50	15	–	–	–	–	1.12	–
Nantucket	3,401	22.75[4]	1,670[4]	549,000	738,000	356,000	329	8.00[5]	69,000
Natick	13,851	–	–	752,000	1,108,000	542,000	–	– *	–
NORTH ADAMS	22,213	38.98	5,243	2,179,000	2,876,000	1,739,000	416	–	–
North Attleborough	10,359	18.33	1,143	–	–	–	–	8.75	–
Northbridge	10,242	16.61	1,058	1,278,000	1,384,000	1,020,000	1,208	12.00	107,000
PITTSFIELD	49,684	96.54	7,664	4,648,000	5,088,000	4,212,000	606	– *	–
Southbridge	16,825	–	–	863,000	979,000	745,000	–	10.95	79,000
Spencer	6,641	10.52	870	538,000	671,000	494,000	618	12.30	44,000
SPRINGFIELD (main plant)	149,554	–	–	15,887,000	17,040,000	15,170,000	–	–	–
SPRINGFIELD (Indian Orchard)	–	–	–	776,000	849,000	715,000	–	–	–
Stockbridge	1,815	4.02	250	–	–	–	–	–	–
Westborough	6,463	8.75	621	317,000	475,000	266,000	510	6.62	48,000
Winchendon	6,575	17.10	554	186,000	248,000	132,000	336	4.00	47,000
WORCESTER	193,694	261.42	31,582	19,750,000	23,460,000	17,350,000	625	– *	–

[1] Includes an average of 2,659,000 gallons per day to trickling filter and 382,000 gallons per day to sand filters.

[2] Entire quantity of sewage not treated.

[3] New development not included in average.

[4] Four miles of sewers and 184 connections in addition to Siasconset.

[5] No underdrains: filters drain direct to ocean.

[6] Includes 70.2 miles of combined sewers.

* For trickling filter data see Table No. 4.

** Activated sludge plant.

THE DIVISION OF TUBERCULOSIS

ALTON S. POPE, M.D., *Director*

In 1941 the long-continued decline in tuberculosis morbidity and mortality appears to have been temporarily checked. This change in the trend is probably related to the war, but is as yet no greater than has occasionally been observed in the past. The number of reported cases of tuberculosis (all forms) was 3,282, or 172 more than last year; the increase is at least partly due to the extensive use of the chest X-ray in military recruits, so that the actual reported incidence of the disease is essentially unchanged. The number of deaths was 1,632 as against 1,598 in 1940.

Tuberculosis morbidity and mortality rates for the last five years will be found in the summary of the Division of Communicable Diseases.

STATE SANATORIA

All the sanatoria have experienced increasing difficulty in securing employees and have been forced at times to employ less capable help or leave positions unfilled. In one of the institutions it became necessary to close a ward for a considerable period, owing to insufficient nurses to care for all patients. Another change which has seriously affected our institutions is rising costs, especially food costs.

There was a shortage of beds for women with nonpulmonary tuberculosis at Lakeville for a part of the year, and waiting lists of cancer cases at Pondville and Westfield. Rutland and North Reading had a variable number of empty beds, and the Westfield Tuberculosis Section a few.

COUNTY AND MUNICIPAL SANATORIA

Legislation was passed in 1941 providing for an investigation of the direct charges to towns for patients in county sanatoria. Another bill was passed which in effect made tuberculosis, or any other infection acquired by hospital employees in contact with patients, compensable under the Workmen's Compensation Act.

STATE SUBSIDY

The total subsidy paid to cities and towns for the care of patients in county and municipal sanatoria in 1941 amounted to $467,541.95. This represents a decrease of $19,513.62 from the 1940 figure. Prior to 1941, subsidy payments had increased each year since the subsidy law was passed in 1911.

CLINIC SERVICES

The school case-finding program results can be seen from the appended table. A number of surveys of colleges and institutions were also made and are summarized in this table. Reclassification clinics were held in 60 communities.

The clinic was called upon for the largest task it has ever faced in the X-raying of approximately 34,000 National Guardsmen and soldiers inducted into the army under Selective Service during the year. These films, furnished by the army, were exposed, processed and interpreted entirely by our clinic personnel using the regular portable X-ray machines. Full details of this work are given in an article to be published in the Commonhealth. The army has now taken over the task with its own staff and equipment.

I. *Clinics Held in Public and Parochial High Schools During the School Year 1940–1941*

A. New Clinics

Number of towns and cities visited	31
Children tuberculin tested	14,487
Reactors	4,363
Per cent of reactors	30%
Number X-rayed	5,237
Pulmonary tuberculosis, active or healed*	17
Incidence of tuberculosis per 1,000 X-rayed	3.2

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*Includes only previously unrecognized cases; does not include suspicious cases which may later be confirmed.

B. Re-examination Clinics

Number of towns and cities visited . . .	31
Children X-rayed	1,252
New diagnosis of pulmonary tuberculosis made .	1
Incidence of tuberculosis per 1,000 X-rayed . .	1

II. *X-ray Surveys Made During 1941*

	X-rays Taken	Pulmonary Tuberculosis (Active and Healed)*	Incidence per 1,000
National Guard . . .	9,832	45	4.6
Regular Army . . .	1,896	9	4.7
Selective Service . . .	22,825	135	5.9
Holyoke Mills	425	7	16
Women's Reformatory . .	328	4	12
Medical and dental schools .	302	3	10
Teachers colleges (9) . .	1,074	1	1
Other colleges (7) . . .	1,869	1	1

*Includes only previously unrecognized cases; does not include suspicious cases which may later be confirmed.

ARTHRITIS HOSPITALIZATION

The contract with the Massachusetts General Hospital for the use of 20 beds for the treatment of arthritic patients was renewed this year, and the program for the study of arthritis continued without interruption.

LAKEVILLE STATE SANATORIUM

LEON A. ALLEY, M.D., *Superintendent***
CLAIRE W. TWINAM, M.D., *Acting Superintendent*

To PAUL J. JAKMAUH, M.D., *Commissioner of Public Health:*

I have the honor to submit the summary of activities of the Lakeville State Sanatorium for the year ending November 30, 1941.

TABLE 1.— *Admissions and Discharges*

Tuberculosis Patients

	ADULTS		CHILDREN		
	Males	Females	Males	Females	Totals
Patients in the sanatorium November 30, 1940	68	49	62	42	221
Patients admitted December 1, 1940, to November 30, 1941	58	69	38	29	194
Patients discharged December 1, 1940, to November 30, 1941	73	59	45	18	195
Patients remaining in sanatorium November 30, 1941	55*	60*	53	52	220
Deaths	7	6	4	1	18
Daily average number of patients . . .	61.3	52.5	62.2	46.1	222.1
*2 boys and 1 girl reached the age of 21 during the year and were shifted to adult columns.					

Poliomyelitis Patients

	Males	Females	Males	Females	Totals
Patients in the sanatorium November 30, 1940 .	4	3	19	20	46
Patients admitted December 1, 1940, to November 30, 1941	10	6	26	26	68
Patients discharged December 1, 1940, to November 30, 1941	7	9	28	32	76
Patients remaining in sanatorium November 30, 1941	7	2*	17	12	38
Deaths	–	–	–	–	–
Daily average number of patients . . .	2.8	2.0	15.3	20.0	40.1
*2 girls reached the age of 21 during the year and were shifted to adult columns.					

Total of Tuberculosis and Poliomyelitis Patients

	Males	Females	Males	Females	Totals
Patients in the sanatorium November 30, 1940	72	52	81	62	267
Patients admitted December 1, 1940, to November 30, 1941	68	75	64	55	262
Patients discharged December 1, 1940, to November 30, 1941	80	68	73	50	271
Patients remaining in sanatorium November 30, 1941	62*	62*	70	64	258
Deaths	7	6	4	1	18
Daily average number of patients . . .	64.1	54.5	77.5	66.1	262.2
*2 boys and 3 girls reached the age of 21 during the year and were shifted to adult columns.					

**On Military Leave of Absence.

TABLE 2.— *Diagnosis and Classification on Admission*

Tuberculosis Patients

(Classification by Most Serious Lesion Present)

	ADULTS		CHILDREN		
	Males	Females	Males	Females	Total
Tuberculosis:					
Of intestines and peritoneum	2	9	–	9	20
Of the vertebral column	7	8	8	2	25
Of the bones and joints (vertebral column excepted)	13	8	7	5	33
Of the lymphatic system (bronchial, mesenteric and retroperitoneal glands excepted)	6	17	2	6	31
Of the genitourinary system	13	16	6	2	37
Of the skin and subcutaneous cellular tissue	7	1	–	–	8
Of other organs	6	5	4	3	18
Unclassified	3	3	3	–	9
Nontuberculous disease	1	2	8	2	13
Total	58	69	38	29	194

Poliomyelitis Patients

	ADULTS		CHILDREN		
	Males	Females	Males	Females	Total
Stage II	7	–	2	–	9
Stage III	1	1	5	–	7
Stage IV	2	5	19	26	52
Total	10	6	26	26	68

TABLE 3.— *Ages of Patients Admitted*

	TUBERCULOSIS PATIENTS		POLIOMYELITIS PATIENTS		Total of Tuberculosis and Poliomyletis Patients		
	Males	Females	Males	Females	Males	Females	Total
Under 5 years	2	5	–	–	2	5	7
5 to 9 years	8	3	2	–	10	3	13
10 to 14 years	7	5	12	8	19	13	32
15 to 19 years	19	11	10	15	29	26	55
20 to 29 years	19	29	6	6	25	35	60
30 to 39 years	14	22	6	3	20	25	45
40 to 49 years	12	10	–	–	12	10	22
50 to 59 years	8	7	–	–	8	7	15
60 to 69 years	6	5	–	–	6	5	11
70 and over	1	1	–	–	1	1	2
Total	96	98	36	32	132	130	262

TABLE 4.— *Condition on Discharge*

Tuberculosis Patients

	ADULTS		CHILDREN			
	Males	Females	Males	Females	Totals	Percentages
Arrested	19	13	18	12	62	31.8
Apparently arrested	9	5	4	–	18	9.2
Quiescent	26	11	4	2	43	22.1
Improved	4	14	1	–	19	9.7
Unimproved	3	3	–	–	6	3.1
Deaths	7	6	4	1	18	9.2
Not considered	2	3	1	–	6	3.1
Nontuberculous	3	4	13	3	23	11.8
Totals	73	59	45	18	195	100.0

Poliomyelitis Patients

	ADULTS		CHILDREN			
	Males	Females	Males	Females	Totals	Percentages
Improved	7	8	26	29	70	92.1
Unchanged	–	1	2	3	6	7.9
Totals	7	9	28	32	76	100.0

TABLE 5.— *Deaths of Tuberculosis Patients by Length of Residence in Sanatorium*

	ADULTS		CHILDREN		
	Males	Females	Males	Females	Totals
Less than 1 month	–	1	–	–	1
1 to 3 months	2	4	–	1	7
3 to 6 months	2	1	–	–	3
6 to 12 months	1	–	1	–	2
1 to 2 years	1	–	–	–	1
Over 2 years	1	–	3	–	4
Totals	7	6	4	1	18

TABLE 6.— *Causes of Death*

	ADULTS		CHILDREN		
	Males	Females	Males	Females	Total
Tuberculosis:					
Of intestines and peritoneum	–	3	–	1	4
Of the vertebral column	1	–	–	–	1
Of the bones and joints (vertebral column excepted)	1	1	1	–	3
Of the lymphatic system (bronchial mesenteric and retroperitoneal glands excepted)	–	1	–	–	1
Of the genitourinary system	1	–	2	–	3
Other tuberculous conditions	3	1	–	–	4
Other causes	1	–	1	–	2
Total	7	6	4	1	18

TABLE 7.— *Outpatient Examinations*

New patients seen	66
Old cases	208
Number of visits	273
Diagnoses made (new patients):	
Negative for tuberculosis	58
Suspicious lesion	1
Extrapulmonary tuberculosis	3
Pulmonary tuberculosis	3
Anterior poliomyelitis	1

TABLE 8.— *Surgical Operations*

*Tuberculosis Patients**

Amputations	3	Tonsillectomies	12
Arthrodeses	32	All other operations	7
Exploratory laparotomies	1		
Incisions for drainage	3		66
Nephrectomies	3	Cystoscopies	36
Other kidney operations	5	Transfusions	31

*Of these operations, 9 were performed at the Baker Memorial Hospital in Boston.

Poliomyelitis Patients

Muscle transplants*	23	All other operations	26
Stabilizations*	26		
Stabilizations and muscle transplants	10		87
Tonsillectomies	2	Transfusions	8

*Including other procedures such as plastics and tenotomies done at the same time.

Employees

Major abdominal operations	3	Cystocopies	1
All other operations	1		
	4		

Casts

Boots	47	Shells	66
Buckets	2	Spicas	78
Cylinders	101	Splints	69
Jackets	154	Reinforcements	82
Moulds	14		613

Respectfully submitted,

CLAIRE W. TWINAM, M.D.,
Acting Superintendent.

NORTH READING STATE SANATORIUM

Carl C. MacCorison, M.D., *Superintendent*

To Paul J. Jakmauh, M.D., *Commissioner of Public Health:*

I have the honor of submitting the summary of activities of the North Reading State Sanatorium for the year ending November 30, 1941.

Table 1.— *Admissions and Discharges*

	Males	Females	Total
Patients in Sanatorium November 30, 1940	106	124	230
Patients admitted from December 1, 1940, to November 30, 1941, inclusive	58	56	114
Patients discharged from December 1, 1940, to November 30, 1941, inclusive	87	71	138
Patients remaining in Sanatorium November 30, 1941	77	109	186
Deaths	6	8	14
Daily average number of patients	89.8	122.4	212.1

Table 2 — *Diagnosis and Stage of Disease on Admission*

	Males	Females	Total	Percentage
Primary phase tuberculosis	26	18	44	38.6
Minimal	3	8	11	9.6
Moderately advanced	2	7	9	7.9
Advanced	3	10	13	11.4
Miliary tuberculosis	1	–	1	.9
Tuberculous pleurisy with effusion	2	3	5	4.4
Tuberculous peritonitis	1	–	1	.9
Bronchiectasis	1	1	2	1.8
Lung abscess	2	2	4	3.5
Convalescent postoperative empyema	–	1	1	.9
Tuberculous cervical adenitis	1	1	2	1.8
Undernourished	1	–	1	.9
Nontuberculous	5	1	6	5.2
Observation	4	3	7	6.1
Deferred	6	1	7	6.1
Total	58	56	114	100.0

Table 3.— *Ages of Patients Admitted*

	Males	Females	Total	Percentage
Under 5 years	23	10	33	29.0
5 to 9 years	11	11	22	19.3
10 to 14 years	15	23	38	33.3
15 to 19 years	9	12	21	18.4
Total	58	56	114	100.0
Average age	7.7	10.4	9.1	.....

Table 4.— *Condition on Discharge*

	Males	Females	Total	Percentage
Apparently well	14	5	19	12.0
Arrested	49	25	74	46.8
Apparently arrested	5	12	17	10.8
Quiescent	4	9	13	8.2
Improved	5	9	14	8.9
Unimproved	4	3	7	4.4
Died	6	8	14	8.9
Total	87	71	158	100.0

Table 5.— *Deaths by Length of Residence in Sanatorium*

	Males	Females	Total
Less than 1 month	1	–	1
1 to 3 months	1	4	5
3 to 6 months	3	1	4
6 to 12 months	–	2	2
1 to 2 years	1	1	2
Over 2 years	–	–	–
Total	6	8	14

TABLE 6.— *Causes of Death*

	Males	Females	Total
Tuberculosis of lungs	3	6	9
Tuberculous meningitis	1	–	1
Miliary tuberculosis	1	1	2
Tuberculosis of peritoneum	–	1	1
Bronchiectasis	1	–	1
Total	6	8	14

TABLE 7.— *Clinic Examinations*

	Consultation Clinics	Out-Patients	Total
New patients seen	322	917	1239
Old cases	413	1143	1556
Number of visits	786	2217	3003
Diagnoses made (new patients):			
Pulmonary tuberculosis	22	21	43
Pulmonary tuberculosis suspect	48	118	166
Primary tuberculosis	2	2	4
Primary tuberculosis suspect	11	32	43
Extrapulmonary tuberculosis	–	1	1
Contact with negative X-ray	87	101	188
Negative for tuberculosis	152	643	795
Total	322	917	1239

Respectfully submitted,

CARL C. MACCORISON, M.D.,
Superintendent.

RUTLAND STATE SANATORIUM

Ernest B. Emerson, M.D., *Superintendent*

To Paul J. Jakmauh, M.D., *Commissioner, Department of Public Health:*

I have the honor to submit the summary of activities of the Rutland State Sanatorium for the year ending November 30, 1941.

Table 1.— *Admissions and Discharges*

	Males	Females	Total
Patients in Sanatorium November 30, 1940	147	128	275
Patients admitted from December 1, 1940, to November 30, 1941, inclusive	153	115	268
Patients discharged from December 1, 1940, to November 30, 1941, inclusive	142	119	261
Patients remaining in Sanatorium November 30, 1941	158	124	282
Deaths	36	29	65
Daily average number of patients	150.6	136.8	287.4

Table 2.— *Diagnosis and Stage of Disease on Admission*

	Males	Females	Total	Percentage
Minimal	15	15	30	11.2
Moderately advanced	36	35	71	26.5
Far advanced	92	54	146	54.4
Unclassified	7	3	10	3.7
Tuberculous pleurisy	–	2	2	.7
Carcinoma of lung	1	–	1	.4
Chronic myocarditis	–	1	1	.4
Pleurisy with effusion	1	2	3	1.1
Empyema	–	1	1	.4
Anthracosis	1	–	1	.4
Arteriosclerosis	–	1	1	.4
Bronchiectasis	–	1	1	.4
Total	153	115	268	

Table 3.— *Ages of Patients Admitted*

	Males	Females	Total	Percentage
Under 20 years	10	8	18	6.7
20 to 29 years	31	47	78	29.1
30 to 39 years	38	42	80	29.8
40 to 49 years	36	4	40	14.9
50 to 59 years	27	9	36	13.6
60 to 69 years	7	5	12	4.4
70 years and over	4	–	4	1.5
Total	153	115	268	
Average age	39.4	32.2	36.4	

Table 4.— *Condition on Discharge*

	Males	Females	Total	Percentage
Arrested	4	5	9	3.5
Apparently arrested	3	6	9	3.5
Quiescent	62	44	106	40.6
Improved	14	10	24	9.2
Unimproved	10	15	25	9.6
Not considered	4	4	8	3.1
Nontuberculous	9	6	15	5.7
Dead	36	29	65	24.8
Total	142	119	261	100.0

Table 5.— *Deaths by Lengths of Residence*

	Males	Females	Total
Under 1 month	5	3	8
1 to 3 months	6	8	14
3 to 6 months	9	6	15
6 to 12 months	6	6	12
1 to 2 years	7	4	11
Over 2 years	3	2	5
Total	36	29	65

TABLE 6.— *Causes of Death*

	Males	Females	Total
Pulmonary tuberculosis	28	22	50
Pulmonary tuberculosis and diabetes mellitus	–	2	2
Peritoneal tuberculosis and pulmonary tuberculosis	–	1	1
Pulmonary tuberculosis and intestinal tuberculosis	1	1	2
Pulmonary tuberculosis and laryngeal tuberculosis	2	1	3
Pulmonary tuberculosis and acute laryngitis	1	–	1
Chronic myocarditis	–	1	1
Carcinoma of lung	1	–	1
Pulmonary tuberculosis, tuberculous pleurisy, and peritoneal tuberculosis	1	–	1
Pulmonary tuberculosis, intestinal tuberculosis, and amyloidosis of liver and spleen	1	–	1
Arteriosclerotic heart disease, pulmonary fibrosis, and bronchopneumonia	1	–	1
Pulmonary tuberculosis, intestinal tuberculosis, and rheumatic heart disease	–	1	1
Total	36	29	65

TABLE 7.— *Clinic Examinations*

	Consultation Clinics	Outpatients	Total
New patients seen	493	368	861
Old cases	282	368	650
Number of visits	775	736	1,511
Diagnoses made (new patients):			
Negative for tuberculosis	339	348	687
Pulmonary tuberculosis	15	10	25
Tuberculosis suspect	132	7	139
Primary phase tuberculosis	7	3	10

TABLE 8.— *Surgical Operations*

Appendectomies	8
Other abdominal operations	10
Tonsillectomies	8
Other minor operations	14
Phrenic emphraxis	2
Bronchoscopies	94
Cystoscopies	4
Blood transfusions	2
Artificial pneumothorax refills	4,988
Aspirations of pleural cavity	185
Total number of inpatients receiving pneumothorax during the year	152
Total number of inpatients receiving pneumothorax at the end of the year	106
Total number of outpatients given pneumothorax during the year	116
Total number of outpatients receiving pneumothorax at the end of the year	75

The following were performed at the Massachusetts General Hospital: 34 thoracoplasties, 14 apicolyses, 1 bronchoscopy, 1 phrenicotomy, and 1 plombage-paraffin.

Respectfully,

ERNEST B. EMERSON, M.D.,
Superintendent.

WESTFIELD STATE SANATORIUM

Roy Morgan, M.D., *Superintendent*

To Paul J. Jakmauh, M.D., *Commissioner, Department of Public Health:*

I have the honor to submit the summary of activities of the Westfield State Sanatorium for the year ending November 30, 1941.

Table 1.—*Admissions and Discharges*

Tuberculosis Patients

	Males	Females	Totals
Patients in Sanatorium November 30, 1940	67	102	169
Patients admitted from December 1, 1940, to November 30, 1941, inclusive	88	84	172
Patients discharged from December 1, 1940, to November 30, 1941, inclusive	78	93	171
Patients remaining in Sanatorium November 30, 1941	77	93	170
Deaths	19	14	33
Daily average number of patients	75.3	98.5	173.8

Cancer Patients

	Males	Females	Totals
Patients in hospital November 30, 1940	18	25	43
Patients admitted from December 1, 1940, to November 30, 1941, inclusive	311	355	666
Patients discharged from December 1, 1940, to November 30, 1941, inclusive	309	363	672
Patients remaining in hospital November 30, 1941	20	17	37
Deaths	38	23	61
Daily average number of patients	20.5	20.2	40.7

Total of Tuberculosis and Cancer Patients.

	Males	Females	Totals
Patients in Sanatorium November 30, 1940	85	127	212
Patients admitted from December 1, 1940, to November 30, 1941, inclusive	399	439	838
Patients discharged from December 1, 1940, to November 30, 1941, inclusive	387	456	843
Patients remaining in Sanatorium November 30, 1941	97	110	207
Deaths	57	37	94
Daily average number of patients	95.8	118.7	214.5

Cancer Readmissions

	Males	Females	Totals
Total patients treated	329	380	709
Less old patients readmitted first time since December 1, 1940	42	59	101
Less other readmissions	46	38	84
Less patients in hospital December 1, 1940	18	25	43
New patients admitted from December 1, 1940 to November 30, 1941	223	258	481
Total number of different patients treated December 1, 1940 to November 30, 1941	283	342	625

Table 2.— *Diagnosis and Stage of Disease on Admission*

Tuberculosis

	Males	Females	Total	Percentage
Advanced	44	35	79	45.9
Advanced with diabetes	3	3	6	3.5
Advanced with silicosis	2	–	2	1.2
Advanced with pleurisy with effusion	1	–	1	.6
Minimal	8	12	20	11.6
Minimal with pleurisy with effusion	1	1	2	1.2
Minimal with pregnancy	–	1	1	.6
Moderately advanced	15	21	36	20.9
Moderately advanced with pregnancy	–	1	1	.6
Pleurisy with effusion	–	1	1	.6
No evidence of tuberculosis	3	1	4	2.3
Unclassified	11	8	19	11.0
Total	88	84	172	100.0

Cancer

Early	15	37	52
Moderately Advanced	40	41	81
Advanced	121	87	208
Non-malignant	47	93	140
Total	223	258	481

TABLE 3.— *Ages of New Patients Admitted*

Tuberculosis

	TUBERCULOSIS			CANCER			Combined Total
	Males	Females	Total	Males	Females	Total	
Under 20 years	4	11	15	6	1	7	22
20 to 29 years	25	30	55	6	8	14	69
30 to 39 years	17	21	38	9	23	32	70
40 to 49 years	16	13	29	29	68	97	126
50 to 59 years	14	6	20	62	83	145	165
60 to 69 years	10	3	13	61	43	104	117
70 to 79 years	2	–	2	43	25	68	70
80 to 89 years	–	–	–	7	7	14	14
Total	88	84	172	223	258	481	653

TABLE 4.— *Condition of Patients Discharged*

Tuberculosis

	Males	Females	Totals	Percentages
Apparently arrested	29	33	62	36.3
Quiescent	4	10	14	8.2
Improved	8	22	30	17.5
Unimproved	15	11	26	15.2
Died	19	15	34	19.9
No evidence of tuberculosis	3	2	5	2.9
Total	78	93	171	100.0

Cancer

	Males	Females	Totals	Percentages
Improved	198	266	464	69.0
Unimproved	73	74	147	21.9
Died	38	23	61	9.1
Totals	309	363	672	100.0

TABLE 5.— *Deaths by Length of Residence in Sanatorium*

Tuberculosis Patients

	Males	Females	Totals
Under 1 month	2	4	6
1 to 3 months	7	1	8
3 to 6 months	4	5	9
6 to 12 months	3	2	5
1 to 2 years	3	1	4
Over 2 years	–	2	2
Total	19	15	34

TABLE 6.— *Causes of Death*

Tuberculosis Patients

	Males	Females	Totals
Pulmonary tuberculosis	14	11	25
Pulmonary tuberculosis and silicosis of lungs	1	–	1
Pulmonary tuberculosis, tuberculous laryngitis, enteritis, tracheitis	1	–	1
Pulmonary tuberculosis, intestinal tuberculosis, hemangioma left forearm	–	1	1
Pulmonary tuberculosis, carcinoma of bladder, asthma	1	–	1
Pulmonary tuberculosis, pericardial effusion, arteriosclerotic heart disease	–	1	1
Pulmonary tuberculosis, tuberculosis of pelvis, rheumatic heart disease	–	1	1
Tuberculous meningitis, pulmonary tuberculosis	1	–	1
Tuberculous meningitis, miliary tuberculosis	–	1	1
Undiagnosed malignant tumor	1	–	1
Total	19	15	34

TABLE 7.— *Clinic Examinations*

Tuberculosis

	Consultation Clinics	Out-Patients	Total
New patients seen	743	2,544	3,287
Old patients seen	99	3,443	3,542
Number of visits	1,110	4,441	5,551
Diagnosis made (new patients):			
Negative for tuberculosis	683	2,306	2,989
Pulmonary tuberculosis	17	117	134
Tuberculosis suspect	27	121	148
Unsatisfactory films	16	–	16

Cancer

Visits to regular Wednesday clinics	3,975
Average attendance	80
New patients seen	1,186
Visits exclusive of Wednesday clinics	2,419
Total clinic visits	6,394

TABLE 8.— *Surgical Report*

Tuberculosis

Thoracoplasties:		Thoracoscopies	2
First stage	8	Open thoracotomy	1
Second stage	6	Drainage of empyema	1
Third stage	3	Bronchoscopies	15
Fourth stage	1	Appendectomies	2
Phrenic crushings	4	Biopsies	6
Extra-pleural pneumolysis	3	Cystoscopies	6
Intra-pleural pneumolysis	63	Minor operations	32
Open pneumolysis	1		
Total			154
Artificial pneumothorax treatments			6,107

Cancer

Major operations	310	Procedures without anesthetics	540
Minor operations	370	X-ray treatments	6993
Biopsies	636	Radium treatments	77
Endoscopies	505	X-ray films exposed for diagnosis	4935
Anesthetics given	1472		

Respectfully submitted,

ROY MORGAN, M.D.,
Superintendent.

PONDVILLE HOSPITAL

George L. Parker, M.D., *Superintendent*

To Paul J. Jaukmauh, M.D., *Commissioner, Department of Public Health:*

I have the honor to submit the summary of activities of the Pondville Hospital, for the year ending November 30, 1941.

Table 1. *Admissions and Discharges*

	Males	Females	Total
Patients in hospital December 1, 1940	53	47	100
Patients admitted from December 1, 1940 to November 30, 1941	629	755	1,384
Patients discharged from December 1, 1940 to November 30, 1941	636	751	1,387
Patients remaining in hospital November 30, 1941	46	51	97
Deaths	83	67	150
Daily average number of patients	55.9	56.1	112

Table 2.— *Readmissions*

	Males	Females	Total
Total patients treated	682	802	1,484
Less old patients readmitted first time since December 1, 1940	121	139	260
Less other readmissions	124	124	248
Less patients in hospital December 1, 1940	53	47	100
Number new patients admitted from December 1, 1940 to November 30, 1941	384	492	876
Total number of different patients treated from December 1, 1940 to November 30, 1941	558	678	1,236

Table 3.— *Ages of New Patients Admitted*

	Males	Females	Total
Under 20 years	9	6	15
20 to 29 years	3	22	25
30 to 39 years	17	52	69
40 to 49 years	25	110	135
50 to 59 years	86	117	203
60 to 69 years	124	104	228
70 to 79 years	89	67	156
80 to 89 years	31	12	43
90 to 99 years	2	–	2
Unknown age	–	–	–
Totals	386	490	876

Table 4.— *Stage of Disease of New Patients Admitted*

	Males	Females	Total
Early	65	62	127
Moderately advanced	106	109	215
Advanced	129	111	240
Non-malignant	82	202	284
No diagnosis	–	2	2
Pending	4	4	8
Totals	386	490	876

Table 5.— *Condition of Patients Discharged*

	Males	Females	Total
Improved	411	551	962
Unimproved	144	131	275
Died	83	67	150
Totals	638	749	1,387

Table 6.— *Clinic Examinations*

Visits to regular Thursday clinics	4,691
Average attendance	92
New patients seen	1,121
Visits exclusive of Thursday clinics	2,959
Total clinic visits	7,650

Table 7.— *Surgical Report*

Operations	1162	Anesthetics given	1,870
Biopsies	489	X-ray treatments	13,114
Endoscopies	447	Radium treatments	372
Transfusions	417		

Respectfully submitted,

George L. Parker, M.D.,
Superintendent.

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ACKNOWLEDGMENTS

The writers wish to record their appreciation of the assistance rendered by all the Division Directors and Bureau Chiefs in the preparation. Especially are they grateful for the careful reading given the manuscript by Dr. Merrill E. Champion and Dr. Edward G. Huber. The preparation of the paper was greatly facilitated by the editorial assistance of Miss M. Elizabeth Donegan.

Though many members of the staff of the Department have helped in telling this story, the writers must bear the entire responsibility for its historical accuracy.

The Massachusetts Department of Public Health is indebted to the John Hancock Mutual Life Insurance Company for relinquishing the services of Raymond S. Patterson, Ph.D., so that he could collaborate with Mrs. Mary Carr Baker in the preparation of this historical review of the Department's history.

R.S.P.
M.C.B.

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THREE-QUARTERS OF A CENTURY OF PUBLIC HEALTH IN MASSACHUSETTS

By Raymond S. Patterson, Ph.D.
Director of Health Education
John Hancock Mutual Life Insurance Company

And

Mary Carr Baker, A.B.
Supervisor of Health Education
Massachusetts Department of Public Health

A surveyor pressing on into uncharted regions establishes bench marks as he moves along. These are points set on solid, immovable objects to which he can sight back to give him a base for new observations. By the same token, it is helpful to us, who are charged with the duty of finding new ways to protect the public health, to look back occasionally toward the bench marks established by our predecessors. This seventy-fifth anniversary of the founding of the Massachusetts State Board of Health—the first in America—seems an appropriate time for us to turn for a moment to take our bearings anew.

This taking of our bearings is a wholesome experience. It was Chapin who warned us that those who ignore the past tend to become complacent about the present. He made it clear that what we need is a healthy dissatisfaction with our own work. For public health—like other human endeavors—does not long remain static. Either it rises to new levels of achievement demanded by the social needs of the day, or we find it beginning to sink below the levels established by its predecessors. We, who must anticipate and prepare for new functions and duties which a thriving public health imposes upon us, can best gain the necessary perspective to do our work well by knowing and understanding the past—by seeing as a whole the moving stream of public health administration in which we so briefly play a little part.

In the illustrious records of the first seventy-five years of state public health administration in Massachusetts there will be found many solid, immovable achievements. There are five bench marks toward which we may in turn profitably sight back in order to take our present bearings and possibly to glimpse the future.

BENCH MARK 1869

Beginning the Pioneering Decade

We can only speculate on the precipitating causes that gave to our country the first State Board of Health. It is reasonable to assume that Civil War experience was not without its effect, for diseases caused by insanitary environment and infected wounds killed many more soldiers than did the bullets of the combatants. Recognition of the deficiencies of military sanitation was carried over to civilian life and soon after the war's end we read of public agitation for the creation of a central health agency of some sort. Four years after the War Between the States, the Act of 1869 was passed.

We know that diphtheria had reached a peak at this time. Massachusetts suffered under this scourge along with most of the other populated areas of the country. Thousands of cases occurred each year and deaths were counted by the hundreds. This could not have been without effect.

Fear of cholera may have played its share. In the Board's first annual report, the Secretary writes: "In 1866, when an epidemic of cholera was feared, the selectmen of Brighton employed Dr. Henry G. Clark of Boston to make a sanitary inspection of the town."

Whipple* credits Dr. Henry Ingersoll Bowditch with the pressure that induced the General Court finally to establish a State Board of Health. At his instigation, the Massachusetts Medical Society twice memorialized the legislature to authorize such a board. A survey of the State's needs was proposed, and later a general health agency was demanded. Through the efforts of politically influential friends, the legislature voted the enabling act—three years later.

Dr. Bowditch himself refers at length in an early paper to the celebrated Chadwick reports which had led to the great sanitary awakening in England. The Chadwick Report a generation earlier undoubtedly had considerable influence in New England.

The second chairman of the Massachusetts State Board of Health, in a candid moment, wrote that the movement had its inception chiefly because of an outbreak of typhoid fever in a girl's school in which the wife of one of the leaders of the legislature was interested.

To a student of the history of public health, our failure to list Lemuel Shattuck's "Report of a General Plan for the Promotion of Public and Personal Health"—the Sanitary Survey of 1850—may seem heretical. We find but slight evidence in the recorded annals of the early days of the State Board of Health that this Report did, in fact, influence the founding of this pioneering venture.*

Whoever, or whatever, may have provided the stimulus for the enactment of the Act of 1869 by the General Court of Massachusetts, the framers of this law showed a surprising grasp of the sanitary needs of the times in the specific obligations which they imposed upon the Board to be created. The law reads in part:

> "The board shall take cognizance of the interests of health and life among the citizens of this Commonwealth. They shall make sanitary investigations and inquiries in respect to the people, the causes of disease, and especially of epidemics, and the sources of mortality and the effects of localities, employments, conditions and circumstances on the public health; and they shall gather such information in respect to those matters as they may deem proper, for diffusion among the people. . . . They shall, in the month of January, make report to the legislature of their doings, investigations and discoveries during the year ending December thirty-first, with such suggestions as to legislative action as they may deem necessary.
>
> "The board shall meet at the state house once in three months, and as much oftener as they may deem expedient. . . .
>
> "It shall be the duty of the board, and they are hereby instructed, to examine into, and report what, in their best judgment, is the effect of the use of intoxicating liquor as a beverage, upon the industry, pros-

---

* "State Sanitation" by George C. Whipple.

* The Sanitary Survey is such a remarkable State paper that an abstract of its principal recommendations will be found in the first appendix.

> perity, happiness, health and lives of the citizens of the state. Also what additional legislation, if any, be necessary in the premises."

Soon after the passage of this law the Governor appointed a board of three physicians and four laymen and instructed the chairman, Dr. Henry I. Bowditch, to call his fellow members together. We have an entertainingly realistic picture of this first meeting. The members gathered in a committee room of the State House, for no other quarters were provided. The address which Dr. Bowditch had prepared has about it a ring of solemnity which suggests that the author was impressed by the historical potentialities of the moment. As this oration is preserved intact in the first annual report and has been widely copied in other histories, only his admonitions to the members, phrased in the florid language of his day, need be recorded here. After reviewing at some length the earlier movement in England, he concluded:

> "Let us look for a moment at some of the general objects and duties involved in the Act establishing our Board.
>
> "First. It directs the Board to take cognizance of everything tending to public health, and of course requires us to endeavor to eradicate everything tending to public disease and death.
>
> "Second. It directs us to diffuse among the people a knowledge of the means of obtaining individual and public health and of preventing disease.
>
> "Third. We are ordered to investigate the effects of the use of intoxicating liquors upon the industry, prosperity, happiness, health and lives of the people, and it is intimated that we may suggest legislation on any or all of the subjects committed to us for investigation. . . .
>
> "The law requires us to diffuse among our people any already established laws of public health, and also whatever we may hereafter discover on that subject. I look upon this feature of the law with deep interest, for I believe by it we may do much service to the people.
>
> "How shall we diffuse this knowledge? (a) By lectures from our Secretary or from members of the Board on various special subjects connected with public hygiene—such as ventilating, and building, and location of houses; on various well-known diseases capable of partial or entire prevention on knowledge of causes being given. . . . (c) By the publication in a compact form and the wide circulation of the pitch of our general knowledge on public hygiene. . . . (d) By our annual reports to the legislature, which, I trust, will always be models of brevity and of compact learning. . . .
>
> "In conclusion, gentlemen, let me say that, while I feel alike our grave responsibilities and the dignity conferred on each one of us by His Excellency the Governor in his selection of us for these offices, I have at the same time no misgivings; but on the contrary, the liveliest hope that this Board will faithfully and in an able manner perform its duties, and that thus it will become a real blessing to our State, not only at the present time, but long after every member of it has died. It will assuredly be such if we, the necessary originators of its various details, only look at our duties in the light of the broadest philanthropy and as far as in us lies, the wisest statesmanship, and finally with all the knowledge that modern science can at present give us."

An Inquiring Board Initiates A Variety of Investigations A week after this inaugural meeting, the Board members reassembled to adopt by-laws, and at this session a half-dozen activities were singled out for investigation by the members—insanitary conditions in slaughter-houses, sale of poisons, an inquiry into sickness and mortality rates in the slums, and a circularization of the local boards of health to advise them of their powers and duties. They proposed to collect and publish the numbers and prevailing causes of death in the larger communities.

Dr. Bowditch's conception of the Board's proper function was that it investigate causes of disease lurking in the air, the earth, and the waters which cover it, and that it give advice to local boards and to the public generally. For many years this able Board was to carry on these varied investigations—some in the realm of sociology, some in environmental sanitation, others in more direct disease control. Those which were to prove most far-reaching in their effect on the national public health were the pioneering studies on the purification of water and sewage. Although the Board had no power to compel action by the cities and towns or the individuals in them, its influence was so great that Massachusetts took the lead in the protection of water supplies and the safe disposal of sewage. The early investigation into the sources of communicable diseases did not achieve brilliant results, for there was as yet but a shaky basis for the nascent epidemiologic science and the energies of the members were forced into other channels whether they wished it or not.

Just as the Board's influence began to be firmly established, and its investigations well under way, someone blessed with unusual foresight and mindful of the historical import of these early pioneering days, seems to have decided that posterity should have a clear picture of the years which were to do so much to mold public health practice in America. While the Secretary of the Board, Dr. Charles F. Folsom, was abroad studying European sanitary engineering procedures, Dr. William Lambert Richardson—long the guiding influence of the Boston Lying-In Hospital—was deputized, as acting secretary, to prepare a summary of the first seven years of the Board's work. It is a brief document, but of absorbing interest to one who is curious about these exploratory years. In this summary is quoted the circular letter which the State Board of Health sent during the first month of its existence to the health boards of the several cities and towns of Massachusetts. After some introductory paragraphs in which Dr. Bowditch voiced the solid convictions of the Board members that public cleanliness is the desired goal if the public health is to be preserved, he wrote:

> "In entering upon our duties, which are rather advisory than executive, we desire to establish such communication with the local boards having this important subject in charge, that all may work together for the common advantage of the people, for the prevention of disease, and for the prolongation of life.
>
> "We believe that all citizens have an inherent right to the enjoyment of pure and uncontaminated air, and water, and soil; that this right should be regarded as belonging to the whole community; and that no one should be allowed to trespass upon it by his carelessness, or his avarice, or even by his ignorance. This right is in a great measure recognized by the State, as appears by the General Statutes.
>
> "If these were strictly and impartially enforced, we should have a con-

> dition of public cleanliness, and of public health, which would make Massachusetts a model for all other communities. . . .
>
> "It has been doubted, whether the public mind is sufficiently aware of the dangerous elements around us; whether the connection between filth and disease is as yet proved to the public satisfaction; whether the people are convinced that undrained land is unwholesome to live upon."
>
> After calling attention to certain laws which local health boards were directed to administer, he closes with these stirring admonitions:
>
> "We confidently look to you for the enforcement of these laws.
>
> "We believe that public opinion will fully support you in so doing.
>
> "We will give all the help in our power.
>
> "There is a great work before us, which, if carried out in the letter and spirit of the laws referred to, we cannot doubt will justify the wisdom which framed them.
>
> "In making this our first communication to the boards of health of the various cities and towns of the Commonwealth, we sincerely hope that it may serve as the opening of friendly and helpful relations between us, and that it will lead to reforms the effects of which will be evident in the improved condition of public health."

Board Members Look First to the Purity of Water Supplies

As soon as its investigations were set in motion, the Board employed William Ripley Nichols, a chemist twenty-four years old and a professor at the lusty new Massachusetts Institute of Technology, recently established in the Back Bay, to begin the examination of ponds which furnished the water supplies for a number of cities north of Boston. This talented chemist continued, for nearly a score of years, to contribute to, and guide the sanitary investigations of the State health agency. To him must be accorded the honor of establishing the technology of water chemistry.

The General Court called upon the Board soon after it had settled down to business to look into the matter of stream pollution throughout the State. Of necessity this included an investigation of sewage disposal. Early findings of this survey inspired the Secretary of the Board, Dr. Folsom, to write a lengthy treatise, published in a later annual report and entitled "The Disposal of Sewage." The limitations of the adolescent engineering science of that time are suggested in the following quotations from it:

> "Water-supplies necessitate sewers; and sewerage-systems in most countries involve pollution of streams. Offensive as this pollution may be, it is less dangerous to health than retaining filth about our dwellings in vaults and cesspools.
>
> "In Salem, Lynn, Haverhill, Worcester, and Boston, with its adjacent cities, the nuisance from putrefying sewage incompletely removed has become a serious evil. The remedies must be determined in each case by careful especial study by experts. We can only say that the principle should be established that each community should dispose of its own filth without allowing it to be a source of offence to others. In the seaboard cities, some modification of a system of intercepting sewers will probably prove the most ready solution of the difficulty. In inland cities and towns, irrigation would be likely to be successful, and not involve a large annual cost; after some experience, it is very likely that even a profit may be realized from it."

Noses Are Directed Toward Brighton Slaughter-Houses It must be remembered that the Massachusetts Board began its labors in a day when scientific beliefs were still befogged with Pettenkofer's assumptions that emanations from moist soil could somehow cause typhoid fever. Scientists still believed that offensive smells gave rise to epidemics—"If anything is settled as to the causes of disease it is the influence of decomposing organic matter in giving life to . . . typhoid fever", wrote the Secretary, so it is not surprising that this Board, composed chiefly of Boston members, first turned their attention—and their noses—to the nearby town of Brighton. In this community a half-million animals were butchered and dressed each year in fifty or more small and exceedingly filthy slaughter-houses. Connected with each were piggeries in which hogs wallowed all summer in decomposing offal, and as a result, there was within a few miles of the center of the crowded metropolitan area an unspeakable nuisance which might at any time—the Board was convinced—become a menace to the health of the inhabitants of Boston. In other nearby cities there were rendering establishments which caused "the air in the immediate neighborhood and oftentimes for miles around to be contaminated with the foul odors and vapors escaping from the vats and improperly constructed chimneys."

The Board members called for an immediate abatement of this nuisance and to this end they proposed an act to finance the construction of central abattoirs. "The plan proposed met, as was perhaps natural," reports the disillusioned Secretary, "with an almost unanimous opposition from the Brighton butchers who regarded the whole scheme as visionary and impractical." The Board persisted, however, and lived to see its efforts crowned not only with the building of the once unanimously opposed central abattoirs, but by the enactment of a law concerning slaughter houses and noxious and offensive trades. This act prohibited the building of slaughtering or rendering establishments without official permission and gave the Board authority to order any person engaged in such business to cease and desist. So we find the Board, which only two years before had been created solely to advise and suggest, given the power to enforce compliance with at least one order.

The Chairman Envisages the Health Menace of the Slums Something of the breadth of the interests of this trail-blazing Board is indicated by the variety of its concerns. Early attention was turned to the sanitary condition of the homes of the poor. The Chairman of the Board visited London and while there made it a point to see the sprawling city's worst slums, of which he gives us a graphic account. Too, he looked into the maiden effort of certain of the public spirited British gentry to provide minimal decencies in the housing for the London poor. Returning home, inspired by this evidence of an awakening social conscience, the Chairman and the Secretary, accompanied by well-armed police, visited the slums of Boston. Here they found degradation and filth worse than any that existed in London. The obvious danger of serious outbreaks of diseases in the crowded, filthy slums, caused the Board to address a letter to the aldermen of the city, who were by law made responsible for health, calling attention to the statutes relating to tenements, which were daily so flagrantly violated. Nothing daunted by the masterly inattention paid to this communication, the Board began an effort to awaken public interest, hoping to show that adding to the health and physical well-being of the poor "would also greatly contribute to the material prosperity of the rich, by furnishing a sure return for the money which might be invested in the sanitary improvements so much needed." This promising financial opportunity seems to have tempted no great number of investors.

"Two difficulties were encountered," writes the Board's reporter. "In the first place, there was found to exist an utter indifference to the subject in the public mind; and in the second place, all health matters were, according to the existing local laws, in the hands of politicians, whose tenure of office was so precarious that they were unwilling to inaugurate any movement which, owing to ignorance or prejudice, would naturally meet with more or less opposition." Nothing seems to have come of this attempt to find a way to decent housing but the Board, through its efforts, did succeed in arousing public opinion to a point which demanded the passage of an ordinance fixing responsibility and granting necessary powers to the city board of health.

Demon Rum Does Not Escape Board's Roving Curiosity

Parallel with these eminently practical efforts looking toward the improvement of the health and well-being of the public were others which seem today less worthy of the Board's talents. To its correspondents throughout the State and, in fact, to many of the American Ministers at foreign courts and to Consuls in the principal ports of the globe, the Board mailed questionnaires about the use of intoxicating liquors and how far the abuse of alcohol was productive of crime. From the two hundred and more replies received, an analysis was undertaken "of the most valuable information bearing on the subject under investigation." From this analysis the Chairman, Dr. Bowditch, came to the unique but firm conclusion "that intemperance was really governed by a cosmic law." Space does not permit a review of the reasoning by which he reached this strange conclusion or an elucidation of its theory—it is enough to record that it seemed both to satisfy the members and to fulfill the demands of the Act creating the Board. One tangible result of these investigations was a proposal that the State establish inebriate asylums in various parts of the Commonwealth, but this appeal came to nothing.

In another report, the attention of the public was called by the Secretary to the hygienic hazards which the erection of dams might produce in their immediate neighborhood. A careful examination of the opinions of many observers convinced the Board that the raising of the level of stream waters was unquestionably prejudicial to health, for epidemics, consumption, and malarial fevers were alleged to be especially prevalent near such places. So Professor Nichols, busy with his water and sewage studies—research which was destined to benefit the sanitary practice of the country—was sent on a wild goose chase to examine ground air to find out, if he could, what baneful and noxious miasma lurked there.

Consumption Investigated Without Benefit of Koch

"About one-fifth of all who die in Massachusetts fall victims to consumption," so wrote the Secretary of the Board in his commentary on a concerted attack on this public health problem inagurated by Dr. Bowditch, himself a specialist in the field of tuberculosis. The first step was to issue a circular letter to the local correspondents throughout the State whom the Board had asked to be appointed by the officials of each town and city. In addition, other members of the medical profession who might throw some light on the subject were addressed. A careful tabulation of the replies led Dr. Bowditch to the assumption that tuberculosis is influenced by hereditary tendencies. The effect of drunkenness of parents on consumption in their offspring is not strongly marked, he argued, but the effect of drunkenness in the individual is. Consumption is favored by overwork, by certain trades and by mental trouble. Of the 210 correspondents, only 100 held the disease to be contagious, but 168 believed it to be caused by a wet location, thereby strongly reinforcing the theory held by Dr. Bowditch himself. Thus, by the democratic process of weighing preponderance of opinion, did the Board fortify its beliefs about the cause of consumption. It is small wonder then that when a few years later, certain communicable diseases were declared dangerous to the public health, tuberculosis was not to be found among them.

Throughout this decade of pioneering, there was a steady growth in the number of public water supplies. In 1869, when the Board came into existence, there were only seventeen cities which piped running water to most of the households of the community. At the close of the decade sixty-eight cities provided such facilities. It is to be noted that despite this increase, the neighborhood pump was still the principal supply of domestic water and the outdoor privy the chief means of the disposal of wastes.

BENCH MARK 1879

The Six Years of Doldrums Commence

After a solid decade of productive pioneering the progress of the Board came abruptly to a halt. The cause of the unfortunate interference with the public's health is given in Dr. Bowditch's angry explanation for his resignation from the Board. He wrote:

> "In 1878 came mutterings of political disaster to the ruling powers, and forebodings of what the renowned General Butler would do with the numerous 'commissions' (that of health among them) that were 'spending wastefully the people's money.' Accordingly, to attack this redoubtable General upon his political 'flank', the legislature, under suggestions from Governor Talbert, merged the three departments of Health, Lunacy, and Charity, a Cerebrus (sic.), in fact, in its grotesqueness of head. Three commissions, all different in ideas and modes of action, jumbled into one heterogeneous mass, simply because the ruling party feared the advent of power of a political adventurer! The prospects were chilling in the extreme to me, and I soon found two sad results; viz., heartburnings and jealousies among the increased number of members, and an almost total neglect of sanitary work. At one time, for three or four successive meetings, nothing was done about sanitation, the time being occupied in discussions on lunacy and charity, on both of which subjects, so far as they had relation to the State, neither I nor my comrades on the old board knew anything. Such neglect of that which we had been for years laboring for was distressing. I appealed in vain for a return to the single board. Political demagogism was rampant, and our efforts were fruitless; and finally, as a solemn protest against the absurd and fatal combination, I resigned, after months of fruitless effort to persuade a change."

So health administration in Massachusetts lost the benefit of the guidance of a courageous gentleman, a physician soundly based in the medical sciences of his day, broad in his scientific interests and endowed with an essential curiosity. Whether or not fear of political consequences inspired this weird conjunction of health with lunacy and charity, it was soon to be evident that the union was a hopeless one.

Enter the Sanitary Statesman— Henry Pickering Walcott

Massachusetts was perhaps luckier than it deserved to be for so wantonly losing the services of the dynamic Bowditch. It was saved from its folly by the chance enlistment of another able sanitarian, Henry Pickering Walcott, who came into the Board's service first as medical health officer of the sub-committee on health. Later he was to become chairman of that sub-committee. Dr. Walcott was a man of many parts—an educated gentleman, a well-trained physician and an outstanding administrator skilled in the several sciences which, with medicine, go to make up public hygiene. In addition to his contributions to health work in the Commonwealth, he was a hospital board chairman, a member of the Corporation of Harvard University, twice acting as temporary president, chairman of the Metropolitan Water Board and the recipient of honors so many and so varied that they may not even be enumerated here.

Because the administrative activities of the overshadowed sub-committee on Public Health of the combined State Board of Health, Lunacy and Charity seemed to wallow listlessly in the doldrums, it does not mean that this was a period lacking any sanitary progress. Indeed, this was a time of marked advance in the creation of municipal water systems. Studies in stream pollution, water purification and sewage treatment which were carried on by the engineers of the State Board's Division of Sanitary Engineering, have become classics in the realm of sanitary science. Incidentally, the creation of this Division of Sanitary Engineering in 1886 was the first instance of formal and functional organization of the Board's work. The Division—oldest of all, and about to celebrate its sixtieth anniversary—has had but two heads since 1895, the able engineers Goodnough and Weston. That is such an unusual record that we cannot forego mentioning it here.

The General Court enacted a law requiring local water boards to furnish data about their community supplies to the newly created Sanitary Engineering Division which annually sent out a questionnaire relating to such practical matters as the source of supply and the quantity of the water consumed. A drainage commission was appointed to plan a metropolitan sewerage project, to apportion its cost, and finally to administer it. The report of this commission is another of the great engineering papers for which the early Massachusetts pioneers are justly entitled to fame. For this report, Dr. Walcott wrote the inspired concluding paragraph:

> "Precisely the same principle which enjoins a watchful care over the exterior waters of the State would seem to call for at least an equal solicitude concerning the abuse of its interior waters. But mindful of the tenderness with which Massachusetts has always treated the industrial classes, we think it would be wise to embrace in the enactment one peculiarly characteristic feature borrowed from the act establishing a railroad commission, and which has proved strong enough to

> enforce amply all the rights of the public in that class of highways called railroads. . . . In a word, it shall be their especial function to guard the public interest and the public health in its relation with water, whether pure or defiled, with the ultimate hope, which must never be abandoned, that sooner or later ways may be found to redeem and preserve all the waters of the State."

During the time of the Board's eclipse, a Food and Drug Act was passed, the second oldest in the United States. In those days nearly every article of food that entered commerce was adulterated in one form or another. Flour was often of inferior quality and even contained dirt. For butter, oleomargarine was frequently substituted. Canned food was preserved with chemicals. Ground coffee was combined with chicory, nut shells and burnt sugar. The list was endless: the variety of adulterants a monument to man's cupidity and carelessness. To put a stop, both to outrageous adulteration and to accidental contamination, four chemists and two inspectors were set to the Herculean task of enforcing the new law. The activity of these men resulted, very soon, in reducing the most frequent of the violations and the worst of the gross carelessness.

During the doldrums, the members of the health sub-committee and the staff all did what they could to mitigate the outbreaks of the various diseases that occurred. Of historical interest is the account of an investigation of an epidemic of malaria in Framingham. Here the relationship of this disease to standing water was discussed, although the agency of the Anopheles mosquito in transmitting the plasmodium was not suspected. The legislature, again "mindful of the tenderness with which Massachusetts has always treated the industrial classes"—in Walcott's words—enacted another law requiring local health boards to notify the State agency of cases of smallpox. Later diphtheria was added, and one by one scarlet fever, measles, typhoid fever listed as diseases dangerous to the public health.

Little by little, the idea of the germ causation of communicable disease was beginning to take hold of the minds of Board members. Dr. Samuel W. Abbott, who succeeded Walcott as health officer of the health sub-committee, made a search of the old case records of cholera in Boston and in connection with it, mentioned Koch's bacteriological discoveries. This is the first public record of the Board's comprehension that germs might be the cause of communicable diseases.

Talbot, the Governor pilloried by Bowditch in his letter of resignation and the signer of the law joining health with lunacy and charity, later accepted the chairmanship of the triple-functioned Board. He paid handsomely for his alleged political timidity, since the Board was continuously under fire, and soon he had his fill of badgering. He resigned and within a year the separation of these agencies took place.

Throughout this period, Walcott had risen in stature. He was in the later forties at this time and in the prime of his influence and understanding. He was ready to take over the reins of the Board when it was released from its combination with lunacy and charity and to give it a singleness of purpose so that productive leadership might achieve far-reaching results.

BENCH MARK 1886

Signalling "the Golden Age" of Sanitation

The eventful eighties were stirring times. The Brooklyn Bridge—one of the world's wonders—was opened to traffic; a German professor announced the discovery of the tuberculosis germ; the first electric streetcar ran in a city street; Klebs saw the diptheria bacillus; Finlay pointed an accusing finger at the mosquito as a carrier of yellow fever; Trudeau went into the Adirondack wilderness to be cured of tuberculosis and there he built "Little Red."

Sewage Experiment Station At Lawrence Earns High Honors

In the eighties, Massachusetts, through its rejuvenated Board of Health was to make one of its greatest contributions to sanitary science—this contribution was the product of the fertile brains of men newly appointed to the staff of the Lawrence Experiment Station.* The station itself was a crude shack of rough lumber, certainly unimposing in appearance, but from it flowed achievements truly impressive. As Whipple says, "The results of its researches have probably been as valuable as the results of all other American sewage experiment stations put together." The establishment of this productive venture must be credited to Hiram Francis Mills, C.E., a member of the Board, who conceived the idea of experiments on the treatment of water and sewage and proceeded to put them into execution. For thirty long years he gave unstintingly to the progress of this work, always without remuneration. His friendship for, and collaboration with, Henry Pickering Walcott throughout all the full years of their association will long prove an inspiration to those of us who hold that man's greatest satisfaction springs from efforts to improve the lot of the race and that in public health there lies an unparalleled opportunity for such service.

Tribute must also be paid to all the pioneering staff of this Station, who, working under the guidance of Mr. Mills and inspired by him, did great things. Because of their zeal and vision, giant strides were made in our knowledge of sewage disposal. Mr. Mills used to say that his greatest discovery was Allen Hazen. Almost a stripling, he was given charge of the Experiment Station in 1886 and, in later years, he became known as one of the outstanding sanitary engineers of his day. The same is true of George W. Fuller, who joined Hazen's staff as a bacteriologist and later succeeded him in charge of the Station. The list of others who were associated from time to time in this work reads like "Who's Who in Science," for, working at the Lawrence Station or in the related chemistry laboratories set up at Massachusetts Institute of Technology, were Dr. Thomas M. Drown, consulting chemist, Professor William T. Sedgwick, consulting biologist, Edwin O. Jordan, bacteriologist, and Harry W. Clark, chemist, who succeeded to Fuller's post and continued in charge of the Station until his retirement.

Not only did the young Professor Sedgwick contribute mightily to the findings of the Lawrence Experiment Station, but in other ways he added materially to the scientific accomplishments of the State Board of Health. He made a revealing investigation of the conditions of market milk in Boston and as a part of this survey, he carried out the first bacteriologic examination of a municipal milk supply ever made in the United States. His studies of typhoid fever broke new ground in developing the epidemiologic method of disease control.

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* A chronological list of the beginnings of the chief activities of the Board, and the Department will be found in Appendix II. We believe that this account will be found more readable if it is not encumbered with a superabundance of historical dates.

Drainage Commission Recommends Oversight of All Inland Waters

As a result of the independent investigations of the Massachusetts Drainage Commission, a law was enacted giving to the State Board of Health general oversight of inland waters. It was instructed to consult with and advise the officials of municipalities and firms concerning proposed systems of water supply and sewerage. The law decreed that this advice should include recommendations for appropriate sources and methods of assuring the purity of potable water and the best methods of disposing of drainage and sewage. Although this legislation made it mandatory to consult with cities and corporations engaged in manufacturing which might give rise to the pollution of inland waters, the Board was given no power to compel action. Despite this lack of real authority—or punitive measures of any kind—the Board's influence on sanitary improvement of the State was enormous. The newly created Division of Sanitary Engineering published exhaustive reports on the science and mechanics of water purification and sewage treatment—reports which today are classical and which for many years were considered textbooks on matters of water supply and sewage disposal.

The Massachusetts Board of Health was to make another series of outstanding contributions to America's public health administration. These were in the realm of the infant science of bacteriology and were to come from a venture in practical preventive medicine, a biological manufacturing laboratory initiated jointly by the Board and Harvard University. Since its beginning, the Massachusetts Antitoxin and Vaccine Laboratory has played a continuous and often highly significant role in the history of the production of prophylactic and therapeutic products for the free use of the citizens of the Commonwealth.

Rapid scientific advances in the prevention of communicable diseases created administrative problems which the State Board determined to surmount so that the resultant knowledge could be put to practical life-saving use. Although the value of smallpox vaccine had been established for nearly 100 years, the practical job of making a reliable vaccine readily available at all times was yet far from solved when the Board recommended the establishment of a State vaccine institution. There were, it is true, numerous sources of vaccine lymph but the quality of the vaccine fluctuated greatly so that there were many failures in creating satisfactory immunity, and a considerable number of untoward reactions. More than thirty years earlier, the farsighted General Court had made vaccination a prerequisite to school attendance, so the Board felt that it had an obligation to provide a dependable vaccine in available quantities. For some years, the recommendation of the Board fell on deaf ears.

Walcott's Vision of a Laboratory Is Fulfilled

However, when Behring and Kitasato discovered that injection of animals with the toxin of the diphtheria bacillus would produce in the animal's blood serum an antitoxin having remarkable curative powers for diphtheria—this knowledge called for action. Diphtheria at that time was a disease of widespread prevalence and tragically high mortality, and for it no effective cure had been discovered.

Reports from Europe, and observations following use of the small quantities of antitoxin available in this country, indicated that immediate and dramatic benefits followed administration of antitoxin even to extremely ill patients. Antitoxin was scarce in America, however, and that which was obtainable from Europe varied considerably in quality. The existence of such a remedy and the difficulties in the way of its general application confronted the State Board of Health with an immediate need for action which could not be ignored. Under the forthright leadership of Dr. Walcott, the Board therefore undertook the production of diphtheria antitoxin in 1894. The City of Boston also began serum production at this time, but discontinued it about four years later.

The production of antitoxic serum was begun at the stable of the Bussey Institute in Forest Hills, and the serum was processed at a laboratory in the Board's offices at the State House. The first serum was distributed in March 1895. At about that time it became apparent that the nature and scope of the work required the direction of a trained bacteriologist. The Board of Health—thanks to Walcott's directness and foresight—obtained the services of Dr. Theobald Smith, who was already one of the outstanding bacteriologists of that time. Dr. Smith left a position in Washington as Director of the Division of Pathology, Bureau of Animal Industry, to become Pathologist to the Board. At the same time he was enabled to continue his distinguished researches through his appointment to the Professorship of Comparative Pathology at Harvard Medical School—a position established for this purpose through the generosity of Mr. George F. Fabyan of Boston.

Laboratory Prospers Under Theobald Smith's Administration

The acceptance of diphtheria antitoxin by the medical profession was rapid, and production expanded from the first year's output of 1700 doses to over 33,000 four years later. The clinical results achieved with antitoxin were indeed remarkable. A Dr. Mason, writing in that year, noted, "The change in the appearance of diphtheria wards since the introduction of antitoxin has been very marked. In making a visit one cannot help being struck with the bright and cheerful appearance of the children." The case fatality rate in diphtheria fell from a general average of 25% before antitoxin to an average of about 11% in treated cases during the very first years of its use. An involuntary experiment which demonstrated the value of antitoxin occurred when "In consequence of an interruption of the use of antitoxin at a well-known hospital, due to a failure of the supply, for a period of a few weeks the mortality among the diphtheria patients immediately rose again to its former height." In 1901 Dr. Smith came to the conclusion that during the first seven years in which antitoxin had been generally available, about 10,000 lives had been saved by its use. During the last two years of this period, the antitoxin distributed was produced at a cost of $14,000, whereas its purchase from outside sources would have cost at that time about $140,000. A questionnaire revealed that from 25% to 90% of the treated patients in various communities would not have received antitoxin if it had not been available free of charge.

The staff of Dr. Smith's laboratory at that time has been pictured by Dr. Reagh, who began work with Dr. Smith on September 19, 1900. In the annals of vaccine production, Dr. Reagh's record must be high for he celebrated the beginning of his 45th year of service by inoculating his 1152nd calf. He recalls that the personnel at the Forest Hills Laboratory in the early days comprised:

Dr. Smith, Director; Mr. E. L. Walker, Bacteriologist; Dr. J. R. Stewart, Veterinarian in charge of the stable; with Mr. Nahum Mitchell and Mr. Julian Horne as assistants. Miss Adams, assisted by Miss Mahoney did the laboratory work and kept records of the antitoxin production supervised by Dr. Smith. Last and largest came Doonan, the "diener", who cared for guinea pigs and attended to the janitor's work.

During this early period Dr. Smith worked steadily at the problem of producing a higher grade antitoxin, and he and his associates carried out innumerable studies to this end. In the annual report for 1896 appears an account of an extensive investigation into the toxin-producing capacities of various strains of diphtheria bacillus.* The success of these studies may be measured in part by the rise in the average potency of the serum distributed, from 100 units per cubic centimeter in 1896 to 425 units in 1900.

Largely as a result of the successful experience with antitoxin, the General Court authorized the Board to produce and distribute vaccine lymph as well. Such an undertaking was out of the question at the already overcrowded quarters in the Bussey Institute. Harvard University therefore made available some adjacent land and, through the munificence of a friend of the University, erected a two-story building designed especially for the work of the laboratory, and the production of smallpox vaccine was begun in this building.

The following year, in a report on "The New Antitoxin and Vaccine Laboratory," Dr. Smith reviewed the history of the institution, pointing out the wisdom of the decision of the Board in initiating this work eleven years previously. He showed that the State's provision of free antitoxin to all, had greatly reduced the mortality from diphtheria; and furthermore that there had resulted from this policy a steady rise in the amount used per case both in Massachusetts and elsewhere. "This influence," he wrote, "has been salutary, for it has been shown that the doses used in the earlier years of antitoxin production were too low." Anent the duty of the State to provide smallpox vaccine, particularly where vaccination is compulsory he wrote, "In European countries this duty is today generally recognized and assumed by public authority. In our country scarcely a beginning has been made. Massachusetts is as yet the only State which has taken up this task; others will certainly follow, for the production of animal vaccine by the State is a logical necessity. Furthermore, it is the only way to bring the physician who performs the vaccination in close touch with the producing laboratory."

A Tribute to Theobald Smith, The Man

Great as were the contributions of the Antitoxin and Vaccine Laboratory, the ultimate value to the world of Theobald Smith's other scientific activities during his period of service to the Board was even greater. He made extensive studies of malaria in Massachusetts, in which he explored the theory that the disease was transmitted by a mosquito and that human beings, especially foreign workmen, were the carriers. His work on human and bovine tuberculosis was continued throughout his years in the Commonwealth and he found time to study anthrax, glanders, and poliomyelitis, among other diseases. Theobald Smith was not only a national but an international authority as well, and the Commonwealth of Massachusetts proudly acknowledges its great debt to him.

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* "A Comparative Study of the Toxin Production of Diphtheria Bacilli," by T. Smith and E. L. Walker.

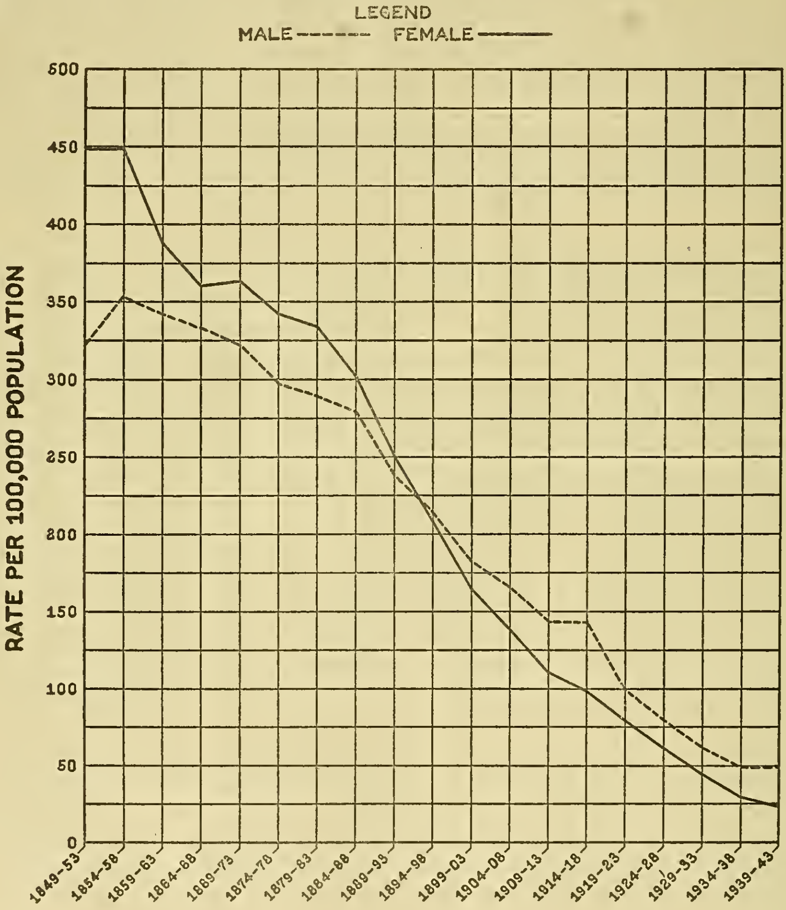
This story would not be complete without some indication of the tremendous effect which Dr. Smith's personality, character and intellect had upon the formation and growth of the laboratory. Distinguished by the possession of one of the most remarkable scientific minds of his age, Dr. Smith was also endowed with an integrity which was as quick to insist upon scientific accuracy, as it was to command personal loyalty and quality of performance. Many of the stories about him which still circulate at the laboratory portray his scorn for intellectual or physical laziness; for he could tear the cover from weakness in character with a taciturn wit that left the recipient demolished of argument but wiser in mind and spirit. It is largely due to the standards set by Dr. Smith that the laboratory owes many of the characteristics which it retains today. One cannot at this point overlook Smith's frugality, which was of truly anecdotal quality. It is said that his discovery of anaphylaxis was a consequence of his policy of using the same guinea pigs repeatedly for antitoxin testing. The often told story that he would borrow a calf from a neighboring farm, vaccinate it, harvest the vaccine and return the calf reflects not so much his frugality as it does the strangely lax production methods of the time.

A "Small Shack at Sharon" Points The Way to Nearby Care of Tuberculosis

Not all the Board's successes were achieved in engineering research and the biological laboratory; scientific advances that were to change the face of public health administration were made in the field as well as in the laboratory. The way was shown to local sanatorium treatment for tuberculous patients by Dr. Vincent Y. Bowditch, son of the illustrious first chairman of the State Board of Health. Medical opinion during the early years of the era was colored by the teaching of Trudeau who believed that it was the clear mountain air which was the essential element in his successful treatment of tuberculosis at "Little Red," his pioneering venture in the Adirondacks. As a consequence, the Southern Appalachians, Colorado and California had become centers of tuberculosis sanatoria. Realizing the inability of any large proportion of Massachusetts patients to travel to these distant places, the younger Dr. Bowditch determined to test the possibility of treating tuberculosis near the towns where people lived. His "small shack at Sharon," which he himself built, was the first sea-level sanatorium and in it he demonstrated the far-reaching findings that success in every way comparable with those achieved at inaccessible sanatoria and at high altitudes were possible at home. On the basis of these results, Bowditch and his contemporaries were able to convince the State legislature of the advisability of establishing in the Commonwealth a State sanatorium for the treatment of patients with incipient tuberculosis.

This sanatorium for tuberculosis—the first State institution of its kind in America—was established at Rutland. The new hospital, laboring under the handicap of the name "The Massachusetts Hospital for Consumptive and Tubercular Patients," not only brought sanatorium treatment to the people but it was the first to provide at public expense treatment for individuals unable to pay for their own care. For patients unable to pay even a nominal rate, treatment at the expense of the town of their residence was provided. These

PULMONARY TUBERCULOSIS IN MASSACHUSETTS
DEATH RATES PER 100,000 POPULATION
BY FIVE YEAR PERIODS FROM 1849 TO THE PRESENT



two principles—nearby, and free, care—unquestionably laid the foundation for the development of the sanatorium movement in this country.

Following the establishment of the Rutland State Sanatorium, clamor for hospital care was so widely voiced that a legislative commission was appointed to investigate measures for the further relief of "consumptives." The outcome of this survey was the establishment of three additional State sanatoria for tuberculous patients. But provision of treatment centers was not enough, community control was called for and we shall learn later how the Board proposed to meet the need.

Before the nineteenth century came to a close, the seeds of still other outstanding pioneering ventures were sown. The need for some public agency looking to the amelioration of cancer was first noted and recorded. The Massachusetts Board reviewed the records of cancer increase over a period of 30-40 years, and this preliminary ground work was followed by the famous Whitney report—a statistical study analyzing the alleged increase in cancer throughout the Commonwealth. At the same time, Harvard University appointed a Cancer Commission which began immediately to play a part in the explorations that were to lead to cancer control in Massachusetts. Progress toward the solution of the cancer problem in this State has continued without interruption from this period.

A Medical Officer Is Appointed To Deal With Local Health

As demands on the State Board of Health became pressing and more numerous and as problems needing study multiplied, it became apparent that permanent employees other than food analysts, sanitary engineers and bacteriologists were needed. As a consequence, the first permanent fulltime medical employee of the Board was added to the staff. The Board's reasoning which prompted this step can be learned from the annual report of 1898, "For the purpose, therefore, of facilitating investigations of sanitary questions in cities and towns and of aiding the work of local health workers, the State Board has organized a new Department of Health of towns and of correspondents with local boards of health, and has appointed Dr. F. L. Morse as its medical and sanitary inspector." Since Dr. Morse's day there has always been a permanent medical personnel to collect information, investigate outbreaks and formulate recommendations.

Nothing in the annual report of the first year of the new century suggests that Walcott and his associates on the Board looked back on an impressive record of pioneering in this "golden age" of sanitation with warranted, and human, pride in accomplishment. But, at this distance, one cannot dismiss their activities without according praise to Walcott and Mills and their contemporaries, who in the final reckoning were responsible for the inspired undertakings of those fruitful years.

Twentieth Century Opens Fruitfully If Unsuspectacularly

The first half of this Board's tenure of office had ended with the close of the century. It may be characterized as a period of great engineering progress and of achievement in the laboratory and in the field. The second half was to prove to be a time for systematizing and organizing. Though this second decade may hold less of historic interest for us, the work which continued until the next reorganization of the Board was of immense effect throughout the Commonwealth. During the first decade of the new century one pioneering venture was the appointment of district inspectors, for this was the first attempt in the United States to localize health adminstration. There were also a number of improvements in the previously established services of the State Health Board which must be recorded.

In the Antitoxin and Vaccine Laboratory the final years of Dr. Smith's directorship were marked by consolidation of and improvement in laboratory techniques and by the assumption of certain new duties. The preparation of silver nitrate for the prevention of opthalmia neonatorum was undertaken. The production of anti-meningococcic serum was begun following the demonstration by Flexner of its therapeutic efficacy. Typhoid vaccine production was taken over from Dr. Spooner of the Harvard Medical School. This, incidentally, represented the first of many collaborations by the Antitoxin and Vaccine Laboratory with nearby academic institutions in making new or untried products available and in improving established biologic products.

As was hinted at the close of the discussion of tuberculosis sanatoria, the need for community control of tuberculosis had long been recognized. Now the Board was in a position to play its part in stimulating the extension of local services, for the legislature had enacted a law creating fifteen health districts, each to be under the supervision of a physician known as the State inspector of health. One of the chief duties of these district representatives of the Board was to inform himself concerning the prevalence of tuberculosis within his area. The State bacteriologic laboratory, which had been in existence more than ten years, was called upon to make examinations of sputa and other material for the tubercle bacillus at the request of practicing physicians throughout the State. Because the great majority of tuberculous patients were coming to the sanatoria in an advanced stage of the disease, the legislature passed the so-called dispensary act requiring every city of more than ten thousand population to establish and maintain a dispensary for the discovery, treatment, and supervision of needy persons with tuberculosis.

Fewer Milk-Borne Epidemics

Despite these stirring advances, numerous outbreaks of typhoid fever ascribed to water and milk supplies continued to occur throughout the early part of the first quarter-century. But when local supervision of these public health hazards was undertaken by the cities and towns, water and milk-borne epidemics became rarer year by year. Emergency pasteurizations of market milk protected the public from doubtful milk supplies during epidemic periods. Begun in this way as an emergency protective measure against typhoid fever, pasteurization by demonstrating its efficacy, soon became a standard procedure for all municipal milk supplies. Meanwhile, the diagnosis of typhoid fever was placed upon a much sounder basis. The Widal test was made available throughout the State by the Board's laboratories. Tests of cultures from blood, feces, and urine were added later.

The most frequent type of milk-borne disease came to light with the discovery that epidemics of sore throat frequently were transmitted by milk. As a consequence, the Board's field personnel devoted much of its time to the encouragement of the use of safeguarded milk and this, in turn, stimulated the protection of commercial pasteurizing methods. Common sense frequently came to the aid of official pressure, for after each new epidemic many persons who had learned by tragic experience that raw milk supplies are dangerous, turned to the use of pasteurized milk.

Systematic dairy farm inspection was undertaken and the deplorable sanitary conditions found in some of the farms induced the Board to urge the passage of legislation obligating local boards of health to undertake dairy inspection.

Insanitary practices surrounding the slaughtering of food animals, a subject which the first State Board of Health attacked courageously and effectively, still continued to plague the third Board forty years later, although a succession of laws had been passed governing the inspection and supervision of abattoirs. An investigation of current conditions revealed more than a hundred slaughtering places doing their grisly business without a sign of worthwhile inspection. Men lacking any qualifications were using the stamp of approval, becoming accomodating "stampers," instead of inspectors appointed to discover and correct insanitary conditions. The general picture was not only one of abattoirs in disgraceful insanitary condition but one which revealed that diseased and contaminated food was reaching the public markets. The legislature, acting promptly and wisely in the public interest, transferred the supervisory powers over slaughtering inspection from local boards to the State Board of Health, giving it power to approve the appointment of local slaughtering inspectors. These instances are typical of the great growth and improvement in administration. It is unnecessary—indeed impossible—to list them all here.

New Days, New Needs, New Means, New Faces That remarkable quarter-century, dubbed appropriately the "golden age" of sanitation, was the time during which the Massachusetts State Board of Health was a conspicuous contributor to scientific progress, but the days of the Board itself were numbered. The magnitude and the far-reaching social consequences of the component sciences of the new public health called for new methods and new types of organization. No longer could an unpaid Board shoulder anonymously the responsibility for all the variety of services which health administration implied, no matter how earnest and willing the Board members might be. The day of the amateur administrator was past. Times called for professional, full-time leadership in which the ultimate responsibility could be placed upon a single individual.

It is strange that so little is remembered today about the men and women who influenced the legislature to change the organization of the State health agency. Dr. Enos Bigelow, a man of parts, and influential member of the Massachusetts Medical Society, a member of the General Court, was one instrument. Other physicians joined him in asking for the change. It is likely that age, and time too, played a part. Henry Pickering Walcott was seventy years old. For thirty years his vigorous personality had dominated every phase of the State Board's work. He maintained an intimate and a firm control upon each of the special activities of the staff. Holding a team with a tight rein may help it pull a heavy load, but when the team grows in number, the reins may be too many for one pair of guiding hands, however firm those hands may be.

Perhaps New York State pointed the way to change. Herman Biggs, already a national as well as state leader in public health, was chairman of a New York survey committee, which had recommended in 1913 a departmental organization for the health administrative agency of that State. Necessary legislation was passed and he was appointed commissioner. Many leaders noted, and applauded this pioneering in the science of public health administration, and Massachusetts especially, must have heeded for the whole government of the Commonwealth was in process of reorganization along modern lines.

Whatever may have precipitated the change, an act was passed in 1914 dissolving the Massachusetts Board of Health and creating the State Department of Health.

BENCH MARK 1914

A New Department Breaks New Ground

Of the several bench marks, that of 1914 is perhaps the most warmly reassuring of all, for we see here our democratic institutions beginning to function at their best. Ready at hand was a new and potentially more efficient health administrative instrument which could be sharpened and improved, or dulled, by the caliber of the staff assembled to man it.

The then Governor, Hon. David I. Walsh, sought the ablest man available to fill the newly created commissionership. He succeeded in inducing the United States Public Health Service to release to Massachusetts, Dr. Allan J. McLaughlin, an officer who had proved his abilities in the field of health administration and a man of outstanding leadership and ability. Incidentally, he had enjoyed a wide international experience having served in the Philippines soon after they were released from Spanish domination. To advise and consult with the new Commissioner, the Governor appointed to the Public Health Council men extraordinarily qualified to uphold his hands. On it he placed Sedgwick, the professor of biology at the Massachusetts Institute of Technology, and Whipple, the sanitary engineer—and historian upon whom we have leaned for much that is related in this account—and Wheelright, a lawyer of wide attainment. With them were the physicians—Edsall, Gallivan and Lamoureux—all men of prominence in their profession. The new Commissioner and Council wisely retained the services of most of the staff of the old Board. At the head of the divisions, which were to be comparable to their former positions, the Commissioner appointed Goodnough, Lythgoe and Clark. For the new divisions, the services of Kelley, Rosenau and Gunn were enlisted.

Goodnough, Lythgoe And Clark Surely it is fitting that we halt this story briefly to pay our respects to these outstanding men. Xanthus Henry Goodnough, C.E., had come to the Board of Health twenty-eight years earlier, at the time when it was released from lunacy and charity, as an assistant engineer to the stalwart Stearns, whom he succeeded in 1895. He carried on the traditions of Mills and Stearns to the Sanitary Engineering Division of the new Department which he served as Chief Engineer until 1930, when he was succeeded by Arthur D. Weston, the present Chief Engineer.

As the last century was coming to a close, a young analyst began his work as assistant in the Food and Drugs Laboratory. Forty-six years later, Hermann C. Lythgoe, full of honors and ready for retirement, was to be drafted for the duration of World War II to continue the direction of the Division of Food and Drugs to which he had been appointed by McLaughlin. At the time of the re-organization, McLaughlin said of him, "Mr. Lythgoe is known to be an expert chemist and analyst and as the director of the division he has demonstrated that he is an energetic executive officer as well." McLaughlin's measure of the man has stood the hard test of many years.

Another gifted administrator who served as quietly and efficiently, and for an even longer period of years was Harry W. Clark, a chemist who followed in the tradition of Hazen and Fuller as director of the Lawrence Experiment Station, finding time to manage the Water and Sewage Laboratories at the State House as well.

Throughout the years of his fruitful, if unassuming, leadership, he was responsible for many advances in the technology of sewage disposal. Imhoff himself attributed to Clark some of the improvements which he incorporated in his methods of sludge digestion in sewage treatment.

Kelley, Rosenau And Gunn The Division of Communicable Diseases was to embrace all the work done by the former State Board of Health in suppressing epidemic diseases and to cover as well much new territory in the special fields of tuberculosis and syphilis control. It was evident that the proper direction of such an extensive service required the full-time attention of a competent public health administrator. The new Commissioner was successful in securing as Director of this Division, Dr. Eugene R. Kelley, formerly Commissioner of Health for the State of Washington. Not only was he a man of proved epidemiologic skill, but when larger responsibilities were to come to him he was to reveal that he was endowed with the vision to guide an expanding department into new fields of endeavor opened by the sharpened needs of a postwar world. It is said of Dr. Kelley that throughout his career he knew more people and was known by more people than any other man in health work. He was influential in the Conference of State and Provincial Health Officers and the American Public Health Association.

Dr. Milton J. Rosenau, a teacher of preventive medicine, once a member of the old Board, and formerly Director of the Hygienic Laboratory of the United States Public Health Service, took charge of the new Division of Biologic Laboratories when Theobald Smith resigned because of the larger opportunities offered him by the Rockefeller Institute. Rosenau carried the laboratory through six difficult years, from the outbreak of the first World War with its critical shortages of personnel and supply, into the period of postwar reaction. Under Dr. Rosenau the laboratory acquired a license from the United States Public Health Service. Compliance with the high standards demanded for this license, further insured the quality of the products of our State Laboratory.

Closest to the heart of Dr. McLaughlin was the new Division of Hygiene. In planning the departmental program, McLaughlin envisioned this new agency as one which would undertake a field broad enough for three divisions into which he hoped the work might ultimately be divided. To launch its ambitious and far-reaching program—on the very small funds available for the purpose—required a division chief who would be resourceful, energetic and would be blessed with sound judgment. Selskar M. Gunn, Professor of Hygiene at the Massachusetts Institute of Technology, was appointed on a part-time basis. Of him Dr. McLaughlin says, "Because of his dynamic force he has been able to accomplish more than other available men would have accomplished on full time." Of such was the stuff of the men whom the Commissioner and Council selected to guide the destinies of the new Department of Health. Once again Massachusetts had shown that a public service could be organized without carrying a burden of incompetents.

The 1915 Report Paints a Picture of Men at Work

We can visualize the beginnings of this promising reorganization by selecting a few brief, "thumbnail" quotations from the account of the departmental activities in the first annual report of the new Department:

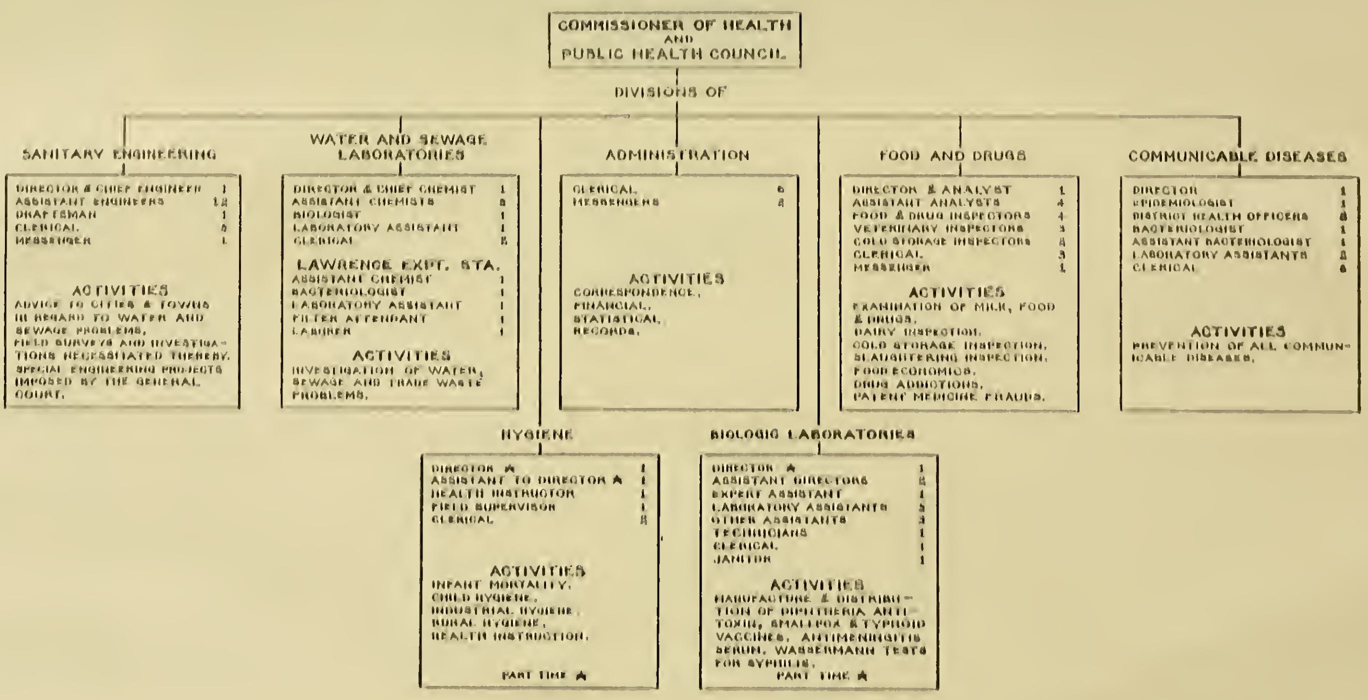
> "The Engineering Division was in existence as a smooth running unit under the old State Board of Health. It is in charge of a highly efficient engineer, Mr. X. H. Goodnough, who also possesses executive ability of a high order.
>
> "The division has been operated together with the Water and Sewage Laboratories and the Lawrence Experiment Station, chiefly under appropriations for purity of inland waters and examination of sewer outlets.
>
> "The work of the Engineering Division has increased enormously because of the increase in requests for advice from cities and towns. . . . The field work of the engineers in complying with these requests from cities and towns has increased to such extent that for three years the field force has been overtaxed."

The Commissioner added this yardstick: "The splendid work of these two divisions (Sanitary Engineering, and Water and Sewage Laboratories) in the past in safeguarding the public water supplies of the State is best expressed by the enormous reduction in typhoid fever."

The tables he offered as evidence show that, for the five-year period ending in 1900, the average annual typhoid fever rate was slightly in excess of 25 deaths per hundred thousand. For the five-year period ending in 1910 the average rate had fallen below 14 deaths per hundred thousand, whereas for the same period ending in 1915 the average rate had sunk to 7.8. "In addition to controlling public water supplies," he added, "very interesting problems in trade wastes are being solved in the laboratories and very valuable research work has been done in regard to depth of sewage filters which activated sludge."

The largely unrelated activities classified under the general head of Food and Drugs had been carried on by the old Board in several different locations by inspectors and chemists who found themselves each responsible to several heads. These positions were transferred to the new Division of Food and Drugs. "I believe," writes Dr. McLaughlin, "that a Division of Food and Drugs would contemplate a broader field than the mere examination of milk, food and drugs. The question of drug addictions, the misuse of so-called proprietary and quack medicines, all present fruitful fields of action." So the new Division bravely set out on its appointed tasks. One example of the variety of problems it faced is typical. Before World War I, America had depended upon Europe to supply the arsenicals used in the treatment of syphilis. When war cut the supply it was discovered that the German patent formulas were fraudulent. It became necessary for the Division of Food and Drugs quickly to synthesize a safe drug, and having accomplished this, to manufacture the new arsphenamines. The Division continued to make these products available for the Commonwealth until

ORGANIZATION OF MASSACHUSETTS DEPARTMENT OF HEALTH
NOVEMBER 30, 1915.



COMMISSIONER OF HEALTH
AND
PUBLIC HEALTH COUNCIL.

DIVISIONS OF

SANITARY ENGINEERING

DIRECTOR & CHIEF ENGINEER	1
ASSISTANT ENGINEERS	12
DRAFTSMAN	1
CLERICAL	5
MESSENGER	1

ACTIVITIES
ADVICE TO CITIES & TOWNS IN REGARD TO WATER AND SEWAGE PROBLEMS.
FIELD SURVEYS AND INVESTIGATIONS NECESSITATED THEREBY.
SPECIAL ENGINEERING PROJECTS IMPOSED BY THE GENERAL COURT.

WATER AND SEWAGE LABORATORIES

DIRECTOR & CHIEF CHEMIST	1
ASSISTANT CHEMISTS	5
BIOLOGIST	1
LABORATORY ASSISTANT	1
CLERICAL	2

LAWRENCE EXPT. STA.

ASSISTANT CHEMIST	1
BACTERIOLOGIST	1
LABORATORY ASSISTANT	1
FILTER ATTENDANT	1
LABORER	1

ACTIVITIES
INVESTIGATION OF WATER, SEWAGE AND TRADE WASTE PROBLEMS.

ADMINISTRATION

CLERICAL	6
MESSENGERS	2

ACTIVITIES
CORRESPONDENCE,
FINANCIAL,
STATISTICAL,
RECORDS.

FOOD AND DRUGS

DIRECTOR & ANALYST	1
ASSISTANT ANALYSTS	4
FOOD & DRUG INSPECTORS	4
VETERINARY INSPECTORS	3
COLD STORAGE INSPECTORS	2
CLERICAL	3
MESSENGER	1

ACTIVITIES
EXAMINATION OF MILK, FOOD & DRUGS.
DAIRY INSPECTION.
COLD STORAGE INSPECTION.
SLAUGHTERING INSPECTION.
FOOD ECONOMICS.
DRUG ADDICTIONS.
PATENT MEDICINE FRAUDS.

COMMUNICABLE DISEASES

DIRECTOR	1
EPIDEMIOLOGIST	1
DISTRICT HEALTH OFFICERS	8
BACTERIOLOGIST	1
ASSISTANT BACTERIOLOGIST	1
LABORATORY ASSISTANTS	2
CLERICAL	6

ACTIVITIES
PREVENTION OF ALL COMMUNICABLE DISEASES.

HYGIENE

DIRECTOR ★	1
ASSISTANT TO DIRECTOR ★	1
HEALTH INSTRUCTOR	1
FIELD SUPERVISOR	1
CLERICAL	2

ACTIVITIES
INFANT MORTALITY.
CHILD HYGIENE.
INDUSTRIAL HYGIENE.
RURAL HYGIENE.
HEALTH INSTRUCTION.

PART TIME ★

BIOLOGIC LABORATORIES

DIRECTOR ★	1
ASSISTANT DIRECTORS	2
EXPERT ASSISTANT	1
LABORATORY ASSISTANTS	5
OTHER ASSISTANTS	3
TECHNICIANS	1
CLERICAL	1
JANITOR	1

ACTIVITIES
MANUFACTURE & DISTRIBUTION OF DIPHTHERIA ANTITOXIN, SMALLPOX & TYPHOID VACCINES, ANTIMENINGITIS SERUM, WASSERMANN TESTS FOR SYPHILIS.

PART TIME ★

improved commercial techniques made it possible to supply the drugs at prices lower than the Division's cost of production.

Not only did the Communicable Disease Division face from the beginning, the control of the usual epidemic diseases by the time-honored method of isolation, but it had to master an entirely new technique of disease prevention, for diphtheria prophylaxis was soon to become a reality. Almost from its first days, the division demonstrated the Schick Test, and both Schick testing and immunization entailed a brand new educational effort if parents were to be persuaded to permit their children to be tested and protected when found susceptible. The point need not be labored that Kelley and his staff found plenty to do.

The act creating the new State Department of Health provided for the employment of eight full-time district health officers instead of the fifteen part-time physicians who had devoted much of their effort to the investigation of the health of factory workers. Though these district health officers were to be the representatives of the entire State Department of Health in their respective districts, the supervision of their work was a function of the Director of the Division of Communicable Diseases. Upon them Kelley placed responsibility for much of the pioneering in promoting general Schick-testing, and later, diphtheria immunization.

From the same annual report we get the most revealing picture of the ambitious program proposed for the new Division of Hygiene:

> "Health officers," wrote Commissioner McLaughlin, "are justified in being proud of the achievements in the prevention of disease and the reduction of the death rates which are recorded in recent years, due largely to official activity. We have now reached a point, however, where further progress demands the hearty support of the individual citizen, and wider application of the principles of personal hygiene by the individual citizen himself. This means education of the people in their obligations to their neighbors and in the simple gospel of disease prevention. . . .
>
> "To reach these people, two very effective agencies are in our hands. . . . I refer to the possibilities of public health or visiting nurses and to the hygiene of school children. In view of the great reductions already effected in the mortality rates for tuberculosis, typhoid fever, diphtheria, and other diseases, largely due to official activitity, it may be said in Massachusetts that further reductions will be in direct ratio to the number of women employed in public health nursing. . . .
>
> "We must concede that this part of the health officer's problems, in which success depends upon the voluntary cooperation of the individual, is much more difficult than that which may be solved by the passage and enforcement of laws and ordinances. The skepticism, and apathy, the passive and even active resistance displayed toward health instruction comes largely from an adult population whose early training did not include hygiene.
>
> "To care for this problem of health instruction the new Division of Hygiene was created. Its scope will include infant mortality, child welfare, medical examination of school children, industrial hygiene, and health instruction in general. It will devote much of its energies to educational methods through literature, lectures illustrated by moving pictures and lantern slides, and personal instruction by its exhibits and health instructors. No special legislation can absolve this Department

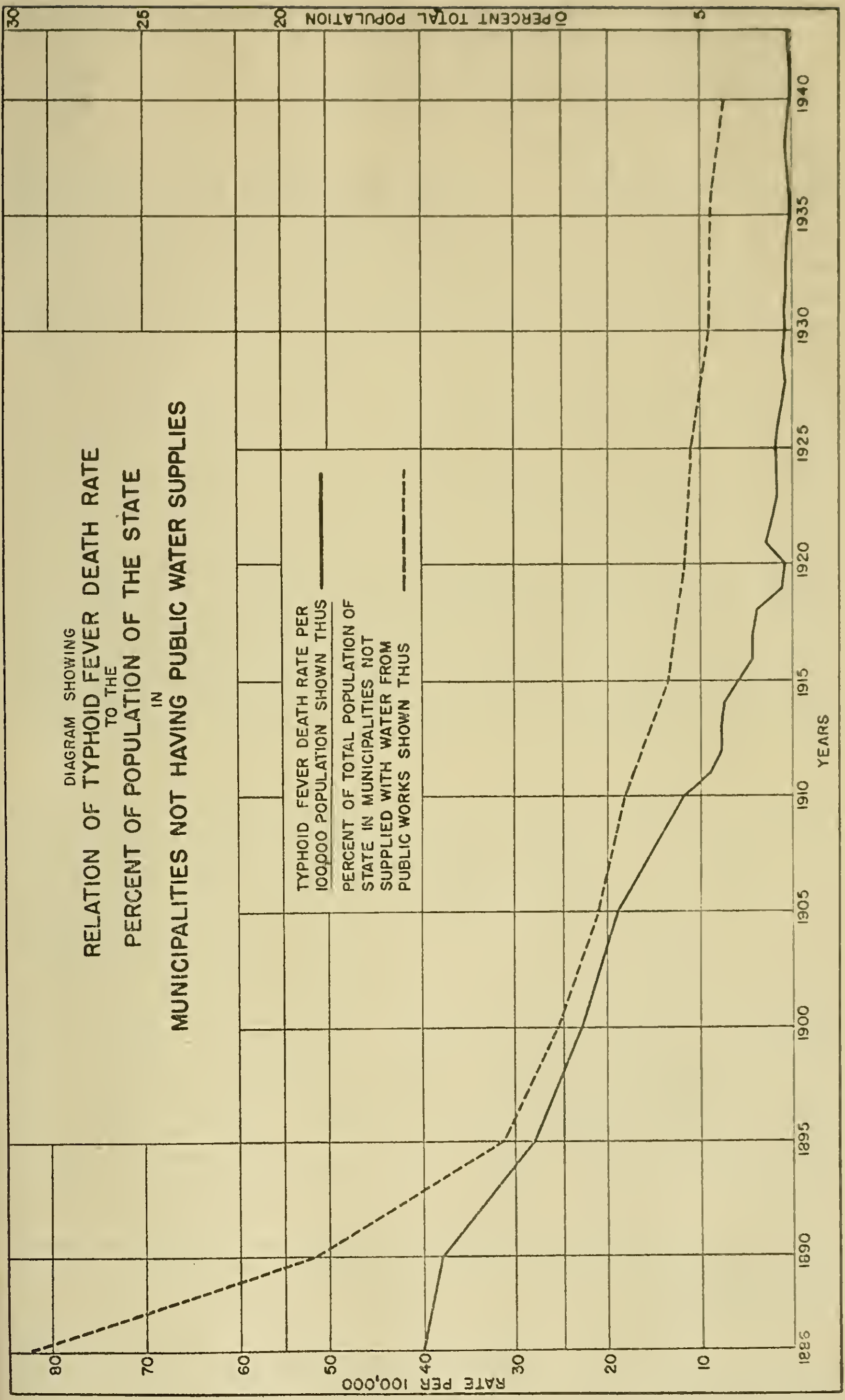


DIAGRAM SHOWING
RELATION OF TYPHOID FEVER DEATH RATE
TO THE
PERCENT OF POPULATION OF THE STATE
IN
MUNICIPALITIES NOT HAVING PUBLIC WATER SUPPLIES
TYPHOID FEVER DEATH RATE PER 100,000 POPULATION SHOWN THUS
PERCENT OF TOTAL POPULATION OF STATE IN MUNICIPALITIES NOT SUPPLIED WITH WATER FROM PUBLIC WORKS SHOWN THUS
RATE PER 100,000
80
70
60
50
40
30
20
10
PERCENT TOTAL POPULATION
30
25
20
10
5
0
YEARS
1886
1890
1895
1900
1905
1910
1915
1920
1925
1930
1935
1940

from its obligation 'to take cognizance of the interests of life and health among the citizens of the Commonwealth'.
"The possibilities of this division in life-saving and disease prevention exceed those of all the other divisions combined."

Each Division Charged With a Definite Life-Saving Job

So we catch a glimpse of the several activities of the Department of Health taking shape, and with many growing pains, the divisions achieving a maturity of purpose in their ambitious programs. The new Department had inherited from the old Board a communicable disease problem so extensive that detailed investigations were out of the question—except in direct emergencies. The numbers of cases of such diseases as typhoid fever and diphtheria were huge as compared with what we have become familiar in recent years. At the beginning of his administration, Commissioner McLaughlin charged each of the various divisions with responsibility for its appropriate share of the existing death rate. The Division of Communicable Diseases, for example, was debited with 15,920 annual deaths which included mortality from syphilis, tuberculosis, pneumonia, diphtheria, measles, scarlet fever, typhoid fever, whooping cough and influenza. Later because of the creation of new divisions for handling these particular diseases, syphilis and tuberculosis were removed from this list leaving a total of 7,920 deaths within the province of the division. If the same allocation were to be made at the beginning of 1944, the total number of deaths for which this division could have been held responsible would have been only 1,020. This, more clearly than anything else, indicates the tremendous reduction in the incidence of communicable disease which has taken place during the last twenty-nine years.

An All-Out Attack On Pneumonia

Soon after the reorganized Division of Communicable Diseases began its control activities, the Rockefeller Institute announced the production of a serum for the treatment of pneumonia caused by certain types of pneumococci and the Department took steps immediately to make use of this discovery. Because lobar pneumonia was the outstanding cause of death among the diseases still debited to the Division, the condition was made reportable and the manufacture of a serum for the treatment of Type 1 pneumonia was begun. The serum was eventually made bivalent by the addition of Type 2. However little use of the serum was made at the beginning, except in metropolitan hospitals where the then cumbersome methods of typing pneumococci could be carried out. After Dr. Felton of the Harvard Medical School produced a more potent product by the chemical concentration of batches of serum supplied by the State Antitoxin and Vaccine Laboratory, a more effective therapeutic agent was available, but still the serum treatment of pneumonia was limited because no practical method for treating cases in the home could be devised due to the lack of laboratory facilities for typing pneumococci.

The Department was dissatisfied with this state of affairs and decided that the program must be either expanded or discontinued. This wholesome dissatisfaction led to action. A five-year study was outlined and the proposal presented to the Commonwealth Fund of New York City as a project worthy of their underwriting. The Fund agreed to supply the means to carry out the study which was to cover three important phases: (1) laboratory investigations to improve the potency and quality of serum; (2) epidemiologic investigations to add to our knowledge of the nature and mode of spread of the disease; (3) field demonstrations to encourage the use of anti-pneumococcic serum by practicing physicians. Noteworthy accomplishments resulted in all three of these fields. The use of serum increased markedly and many hundreds of lives were saved during the period of the five-year study. A rapid method of typing pneumococci by the Neufield reaction was initiated by the bacteriological laboratory of the Department and this increased the effectiveness of the program* and over eighty typing laboratories and serum distribution centers were set up in hospitals throughout the Commonwealth.

It would be impracticable to trace the work of the Division of Communicable Diseases in connection with all the infection during the two decades of administrative expansion under review. Although the Department has been a pioneer in devising and applying new methods to the control of diseases other than pneumonia, it is difficult to leave this intriguing subject without some reference to the related work of the Diagnostic Laboratory. For the first two decades of its existence, one bacteriologist had been able to perform with reasonable adequacy the limited number of examinations which science had perfected but, with the reorganization of the Department, Miss Edith A. Beckler, who has been in charge ever since, was appointed a full-time bacteriologist and the staff began thereafter to increase rapidly. Within a few years, it became necessary to keep the laboratory open daily and Sundays and to give twenty-four hour service—one bacteriologist being on call during the night. The work of the Laboratory had been limited mainly to the bacteriologic diagnosis of communicable diseases. Laboratory tests such as urinalyses and blood chemistry had never been undertaken, but the development of serum and drug therapy of pneumonia complicated the work and imposed further burdens, for a variety of detailed studies may be necessary upon a single specimen from a case of communicable disease. Such studies have proven valuable to the epidemiologists of the Department in tracing sources of infection, and intricate bacteriological work of this nature has continued to increase to this day.

With the creation of a venereal disease subdivision in the new Division of Communicable Diseases, a Wassermann Laboratory was opened as a unit of the Division of Biologic Laboratories under Dr. William A. Hinton, who was to give to the country a simplified but sensitive blood test which bears his name.* Soon, thereafter, the State Department of Health declared syphilis and gonorrhea to be diseases dangerous to the public health—which must be reported. A program for handling and recording case reports of gonorrhea and syphilis was formulated and set in motion.

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* Just as the use of antipneumococcic serum was becoming universal, the sulfonamide drugs were introduced for the treatment of pneumonia. These drugs, and later penicillin, have proved so effective that the need for serum treatment is greatly reduced. However, serum still plays a role in the pneumonia control program. In certain cases of pneumonia, serum remains essential to good treatment. So, despite the marvels of present-day drug therapy the pneumonia studies of the Department may be set down as one of the modern contributions comparable to those which came from the Board's staff during the middle nineties.

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* A survey conducted jointly by the U. S. Public Health Service and the American Society of Clinical Pathologists has shown the Hinton test, as carried out in this laboratory, to rank among the first three in nationwide evaluations.

With the Treatment of Venereal Diseases the Department Embarks Upon Medical Care

Free diagnostic facilities for venereal diseases were put into operation and efforts made to establish a state-wide chain of clinics. Distribution of arsphenamine was instituted, and when the first World War came, the State venereal disease control program was geared to the nation-wide plan of the War Department and United States Public Health Service. Twelve clinics began to function when the Federal allotments under the Chamberlain-Kahn Act, with matching funds from the State, provided the means for these health and medical services. An ahead-of-the-time study of social service needs of venereally diseased patients was initiated and the first medical social worker in the Department was appointed as a result. According to the annual report of that first war year, "The Subdivision of Venereal Diseases has been able to function better. . .due mainly to the addition of a social worker and a special investigator. . ." The duties of both these new employees included the follow-up of infected cases, visits, and cooperative work with boards of health, State clinics and social services. The report comments, "Pleasant cooperation was established, but with only one social worker in the State an effective demonstration of the possibilities of medical social work was scarcely possible."

An Ambitious Program In Hygiene

In his original assignment of deaths to be prevented, Commissioner McLaughlin had assigned to the Communicable Disease Division the task of preventing deaths from the epidemic diseases; but upon the Division of Hygiene, he imposed a still greater responsibility. Control of deaths from the diseases of infancy, tuberculosis, cancer, and all the so-called wear and tear diseases of adult years was placed on the shoulders of the hygienists. This was a large order. The early years of this new division were of necessity exploratory, for there were few precedents to guide it. A dozen different surveys, tentative activities and demonstrations were gingerly attempted. A statistical study of the infant mortality of 355 towns was undertaken to determine where the health educational needs were greatest and what means might be employed to meet them.

A health lecture service and a motion picture distribution plan were set in motion. Health films of that day left much to be desired, but they did serve as bait to draw audiences. Health education was in the stage of trial and error—performance might be less than perfect, but aim and spirits during this period were high. An ambitious child health exhibit with the usual profusion of panels* was hurried from community to community by two public health nurses who interpreted for the open-mouthed audiences the wealth of statistical data the panels displayed. The nurses gave numerous talks to children as a sideline feature. The breadth of the educational interests of the division are indicated by the appearance of such diverse brochures as the booklet "Baby and You" and a pamphlet on mosquitoes and malaria. The former monthly bulletin, dignified now by the title "The Commonhealth" made its pedagogical bow to the Commonwealth.

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* The twenty panels of the child welfare exhibit called attention to successive steps in the care of infants and children. In great profusion were displays of model layettes of baby clothing; iceboxes; infant feeding outfits; horrible examples of ill-kept rooms, and, by way of contrast, an attractive nursery. As evidence of the area which infant hygiene proposed to include, a polluted water supply and a protected one were thrown in for good measure. The extent of the infant mortality problem was dramatized by means of a "flashing device," so the report informs us.

For a number of years both the Department of Education and the State Board of Health had had responsibilities placed upon them to guard the health of school children, but there had been little collaboration between them. Shortly after 1918, a closer liaison was effected between these two departments for there was a growing interest in the health of the school child on the part of both. A record form was devised to improve annual medical examinations of school children which were supposed to be carried out in every community in the State. Joint conferences were held by the two departments with school superintendents, physicians and nurses in order to promote a better understanding of the possibilities in school health administration. State normal school summer courses were given so that teachers and school nurses might gain some appreciation of the value of the health instruction of the children in their charge.

Some measure of the deficiencies of school health supervision of that day is found in the number of full-time medical inspectors in the entire State. There were three. In addition to stimulating good medical services, the Department sponsored the passage of a law requiring a school nurse for every community. Within a few years this requirement had been fulfilled. Neither was the subject of nutrition to be neglected, for a staff member, officially labelled "qualified food worker," was employed to write and talk on the broad topic of food in all its hygienic aspects. One good thing leading to another—a "mouth hygienist" was later added to the staff, largely because of the efforts of Dr. Edwin P. Kent who had given his services in laying the groundwork for a dental program.

Insistent demands of a nation at war deprived the State of Allan McLaughlin's able leadership, but Dr. Kelley, with rare administrative capacity, succeeded him as Commissioner and directed the Department so successfully that it met its larger obligations which had been revealed dramatically by the first World War draft.

As the scope of the Division of Hygiene's activities had been stretched to encompass the cradle and the grave, the administrative obligations involved were so onerous that no part-time head could possibly direct them all. Professor Gunn —and his immediate successor—bowing to inexorable reality, had resigned and when Dr. Kelley assumed the commissionership, he appointed immediately a full-time director of the Division of Hygiene. He selected Dr. Merrill E. Champion, a district health officer, to undertake the job of guiding the varied and seemingly unrelated parts of the divisional program.

From its inception, the preponderant part of the effort of the Division of Hygiene was directed toward child health, the remainder being devoted to adult hygiene. During these early years, the staff continued to show the multipaneled educational exhibit at county fairs. In connection with this display, a pediatrician gave free examinations to children who were presented by their parents. A dental hygienist looked into the children's mouths, while a nutritionist demonstrated to their parents all the foods that might later go into the same mouths. Perfectionists among present-day psychologists and pedagogues may frown upon such side-show demonstrations as educational devices, but the interest they generated in the townspeople who swarmed to the fairs did much to stimulate the desire for school nursing services under local auspices throughout the State.

The success of the child health exhibits at the fairs led the Department to widen the field of this educational device. A model "T" Ford truck to transport it and an allegedly portable tent to house it were purchased. A troupe of per-formers was organized to take the show to granges, health weeks, indeed to any place where an audience could be induced to gather. The nurses, nutritionists and educators lugged their own trunks, they cleaned the hall, they set up the "pitch" like any trouper, then hurriedly changed their costumes and put on the show, a part of which was a dramatic performance called "The Lion and the Nurse," of which it is said, that in its histrionic effect "Uncle Tom's Cabin" paled in comparison. When the last child and parent had been entertained, examined or instructed, the crew folded their tent "like the Arabs" and wearily called it a day. After some years of trouping the realization began to take shape that this shotgun educational method might better be superseded by an effort aimed more particularly at definite hygienic objectives.

Early Days of Well Child Conferences

Inspired in part by the portable educational exhibit, well child conferences were conducted at the request of some responsible local agency with permission of the board of health, and were held in a school house, town hall or some other central building. No medical treatment of any kind was given. The purpose of the clinic was merely to demonstrate a need and a method of meeting it. When children were found ill or in need of corrective treatment, they were referred to the family physician. Not only was no medical treatment given, but the conferences were intended to be demonstrations only. Once their value had been made clear, the Division felt its duty had been fulfilled, temporarily at least, because the responsibility for carrying on the work now rested with the community itself. The services of the State staff were always at the disposal of the community to assist, but not to supplant, local child health activities.

Although the legislature, with rare and typically New England independence, refused to accept the Federal funds allocated to States under the Sheppard-Towner Act, it did increase appropriations for child health work to such an extent that it was possible to employ an adequate staff of competent specialists in the fields of pediatrics, dental hygiene, public health nursing, and nutrition. (It may be of interest to note that although Sheppard-Towner funds were refused, a previous legislature had not been averse to matching Federal funds appropriated for venereal disease control under the Chamberlain-Kahn Act.)

Tuberculosis Prevention Becomes A Major Activity

Soon after the State Board of Health was reorganized to form the State Department of Health it became apparent that the treatment and prevention of tuberculosis was a major obligation which could not effectively be met as a subdivisional activity of the Communicable Disease Division. A general rearrangement of many Massachusetts Boards and Commissions effected a second reorganization of the Department of Health, in which the name was changed to the State Department of Public Health. One of the chief purposes of the reorganization was to delegate to the Department the administration of the Commonwealth's tuberculosis sanatoria. So, a State Division of Sanatoria and Tuberculosis was duly established in the Department and the administration of the hospitals was transferred from the Boards of Trustees who had formerly managed these institutions. To Dr. Sumner H. Remick, the second Director of this Division, is due the major credit for the sound planning of the next decade which served to place Massachusetts in the front rank of sanatoria administration. Of interest to the collector of odd items, is the transference of the Penikese Leper Hospital to the Division along with the sanatoria. Few people are aware that the State ever maintained a hospital for lepers—or indeed that there were lepers in Massachusetts.

Prior to the passage of the reorganization act, the tuberculosis work of the Department had been carried on through the district health officers and the central staff of the Division of Communicable Diseases. Reports of cases and deaths from tuberculosis came from physicians and boards of health, and lists were compiled of known cases covering the period between reorganizations. To the district health officers now was given the job of putting these lists to practical use in the solution of the tuberculosis case-finding program.

Chadwick Clinics Begin Ten-Year Project

High mortality from tuberculosis among adolescents, both in the State Sanatoria and in homes throughout the Commonwealth, so impressed the State legislature that, at the close of the first quarter of the twentieth century, a State program was authorized for the prevention and control of tuberculosis in childhood. Under the leadership of Dr. Henry D. Chadwick, mobile clinics were organized for the examination of school children, using the tuberculin skin test as a screen and providing X-ray chest examinations for those showing positive reactions. By the discovery and treatment of the then-called childhood infections, it was thought possible to prevent the development of tuberculosis in adult life. During this period of ten years, nearly a half million children were examined and several thousand were hospitalized. Two State sanatoria were converted into institutions for the care of children.*

The second half of this period of departmental growth (1925-1936) began tragically. Dr. Kelley, still a young man with a challenging future, had taken up the burdens of administration where Dr. McLaughlin had been forced to drop them. In a few brief years he had measurably increased both the scope and the life-saving values of the departmental program. His sudden death came as a disheartening blow to his associates, every one of whom was a devoted friend filled with admiration of him as leader and man, and it required all the really great capabilities of the versatile George Bigelow to rally them from their despondency. But Dr. Bigelow, brilliant in mind, shrewd in leadership and always inspiring, tossed into the task of carrying on the work of the Department all his seemingly inexhaustible store of vitality. He succeeded not only in creating a new will to achieve, but at the same time he overcame a continuing public indifference to the need of good health services with a good-natured gusto, but often with scarcely-veiled sarcasm.

This was a period of economic ups and downs. The roaring twenties, with their promise of "permanent prosperity", saw the Department embark upon a cancer program as radically new and as far-reaching in its potentialities as the celebrated Chadwick clinics were in the field of tuberculosis, and when the prosperous twenties had given way to the desolate thirties, the departmental activities turned toward the relief of human want and malnutrition.

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* Although the hope of preventing tuberculosis by the hospitalization of children with primary disease was not realized, the Chadwick clinics proved as useful to the science of public health administration in their negative findings as in their positive answers to the questions of tuberculosis prevention. The program had far-reaching results in the education of the public about tuberculosis. Among the significant facts brought out was the relatively high resistance in children between three and ten, and the high fatality of tuberculosis in the teen ages. The survey showed that under present day conditions, tuberculosis disease in childhood occurs in such a small percentage of cases that the routine examination of children in the elementary grades is not justified. But the findings did indicate the age groups and the social conditions under which tuberculosis testing might profitably be intensified. All in all, the Chadwick clinics contributed greatly to the nation's understanding of the problem.

Events demanded that the Division of Hygiene be separated into two new and independent divisions—one to be concerned with adult health, the other with maternal, infant and child health. For administrative purposes the dividing line in the responsibilities of the two new agencies was to be age eighteen.

Adult Hygiene—Euphemism For Cancer Control

Early in his administration Commissioner Kelley broke new ground when he asked for an appropriation to be used for the control of cancer, for no other state health agency had entered this field. The funds he received were used to inaugurate the tumor diagnostic service and to carry on a statewide educational program—treatment having no part in this plan. Meanwhile, Monsignor Roche, a Chaplain of one of the few hospitals which then would accept cancer cases for terminal care, became the central figure in a movement demanding of the legislature the granting of appropriations for a State hospital to care for cancer patients. Though a joint committee of the Departments of Public Health and Public Welfare opposed a State supported hospital and recommended that the Department concern itself with promoting the extension of facilities for the care and treatment of the disease, the legislature ordered the establishment of both a hospital and diagnostic clinics which were to be administered by the Department of Public Health. A vacant institution was reconditioned to care for cancer patients—the Pondville Hospital.

Three years elapsed before the Division of Adult Hygiene was created, and during the interim the cancer program was carried on by a cancer section in the Division of Hygiene. When the new division was established, the name Adult Hygiene was used as the word cancer was then held to be too obnoxious. There was no intention at that time of entering generally into the broad field of the hygiene of the adult.

The cancer program evolved by a committee appointed by the Commissioner had as its principal feature: cancer clinics, tissue diagnostic service, hospitalization of cases, public education and both etiologic and evaluative research. The plan was accepted, the General Court appropriated funds for twelve diagnostic clinics, and so the Department was embarked upon the first cancer control program to be undertaken in any State. With the exception of the administration of the cancer hospital, which was placed with other department hospitals under the jurisdiction of the Division of Tuberculosis, the cancer program was administered by the newly formed Division of Adult Hygiene.

Diagnosis and treatment are not enough. Cancer control, like that of tuberculosis, is a social problem. People must be induced to seek protection. One of the most influential activities in the cancer clinic program proved to be the first of the "Cured Cancer Clinics." These were reviews of case records of patients from whom proved cancers had been removed, and who had lived beyond the time of probable recurrence. These "Cured Cancer Clinics" were most influential in changing the attitude of the practicing physicians of the State toward the control program, from one of skepticism to one of warm support. Although the practicing physicians came to appreciate the value of the whole cancer preventive program, there was evidence that the public could not thus be awakened to the life-saving possibilities in cancer control. A realization of this public inertia set the Division in search of a new educational device, which later came into being.

Emergency Relief Colors Child Hygiene Program

The exigencies of the world-wide depression of the early thirties was not without its effect upon the program of the Child Hygiene Division which had just been separated from adult health work. Not-to-be-denied demands for concrete relief measures, rather than for professional guidance, were heard throughout the State. It was a time for bold decisions, and Dr. M. Luise Diez, the newly appointed Division Director, made them gallantly. The day's work was concerned more than ever with such practical matters as low-cost menus for children and pregnant women, and inexpensive meals for other adults as well. One nutritionist was sent to the then bankrupt city of Fall River to devote her entire time to a struggle with the dire problems of planning meals on a subsistence level. Calls came from wholesale and chain grocers for help in passing on the day-to-day advice about food economies to their hard-pressed customers. Great quantities of leaflets on nutrition for the emergency were struck off for quick distribution throughout the State. The American Red Cross, busily distributing flour to the needy, called for the active support of all the nutritional staff to help them in educating homemakers.

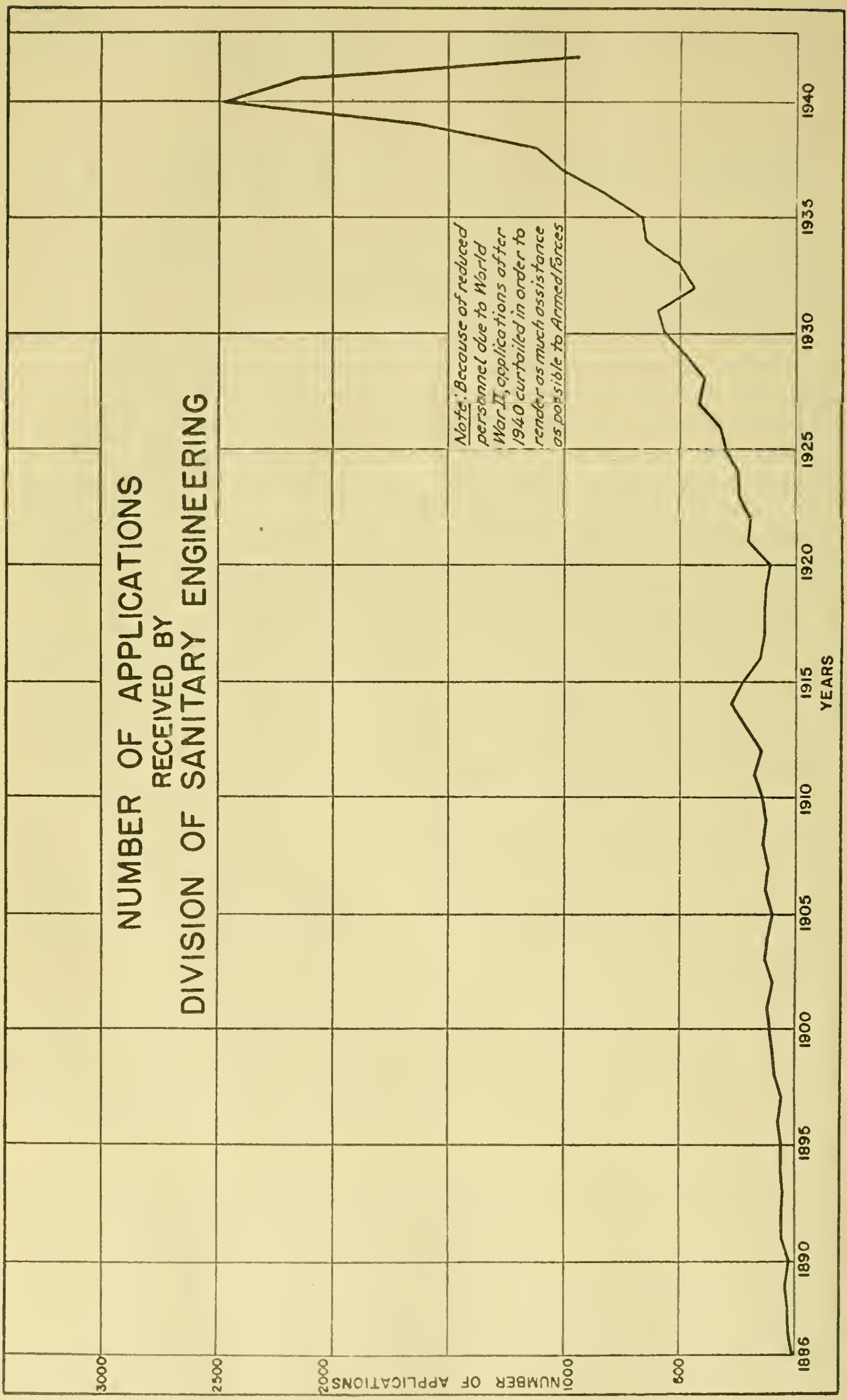
In cities where the need was greatest, the nutritionists entered the markets to give on-the-spot advice about economical wholesale buying. Surveys made of school meals revealed their nutritional inadequacies, and as a result demonstrational school lunch projects, some free, were conducted in the neediest communities throughout the State. Pediatricians, nurses and nutritionists alike pitched in to give hard pan services.

It should be noted, however, that the staff, even as they rose to these emergencies, did not neglect their demonstrational well child conferences and other services designed for long-range health improvement. Dental hygienists continued to conduct research on the health of children in sanatoria. High school health councils were being formed, and a demonstration in health education was given in one of the Lynn high schools in cooperation with the Massachusetts Tuberculosis League.

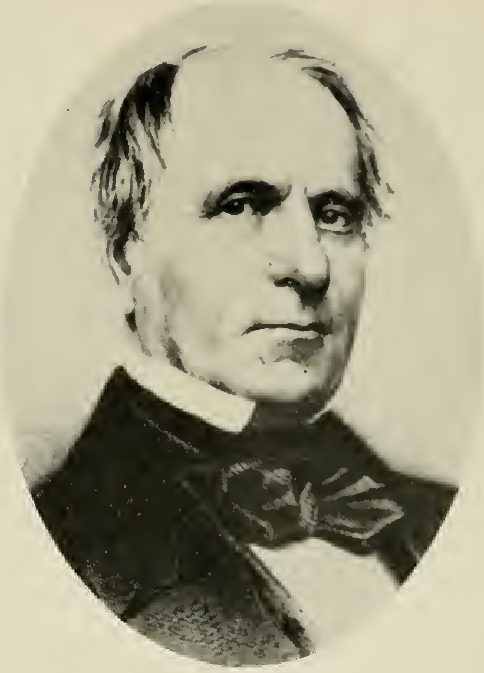
It would be unprofitable to enumerate here all the conventional sanitary and preventive medical services which the various divisions of the Department continue to perform during fair economic weather and foul, but this account cannot overlook several of the more newsworthy activities that were undertaken or developed during this eventful decade in the Department's history.

Path-Finding in Shellfish Sanitation

Clams grown in polluted water create a health hazard which had long been a matter of Department concern. The law had obligated it "to examine from time to time the tidal waters and flats of the Commonwealth and samples of shellfish therein" to determine if they were unfit for food and dangerous to the public health. Many areas where shellfish grew abundantly were found polluted, so experiments were begun at the Lawrence Experiment Station to determine the practicability of purifying soft-shelled clams from the less grossly polluted areas. Later these experiments were conducted on a larger scale


NUMBER OF APPLICATIONS
RECEIVED BY
DIVISION OF SANITARY ENGINEERING
Note: Because of reduced personnel due to World War II, applications after 1940 curtailed in order to render as much assistance as possible to Armed Forces
NUMBER OF APPLICATIONS
3000
2500
2000
1000
500
YEARS
1886
1890
1895
1900
1905
1910
1915
1920
1925
1930
1935
1940

PIONEER IN PUBLIC HEALTH



Lemuel Shattuck
1793-1859

SECRETARIES
OF
MASSACHUSETTS BOARD OF HEALTH
1869-1914

Henry Ingersoll Bowditch, M.D.

Henry Pickering Walcott, M.D.

COMMISSIONERS
OF
MASSACHUSETTS DEPARTMENT OF PUBLIC HEALTH
1914-1933

Allan J. McLaughlin, M.D.

Eugene R. Kelley, M.D.

George H. Bigelow, M.D.

COMMISSIONERS
OF
MASSACHUSETTS DEPARTMENT OF PUBLIC HEALTH
1933-——

Henry D. Chadwick, M.D.

Paul J. Jakmauh, M.D.

Vlado A. Getting, M.D., Dr. P.H.

in Newburyport. The outcome was the establishment at Newburyport, of the first shellfish purification plant, in the country—and today the Sanitary Engineering Division maintains close supervision over this useful method of conserving a not inconsequential part of our food supply.

Federal emergency work projects of various kinds made new demands upon the sanitary engineers of the Department. Before the C. C. C. camps could be established, sanitary surveys of the areas proposed for sites had to be made. A wide variety of water supplies and sewage treatment works, the construction to be financed through W. P. A. funds, each had to be approved by the Department engineers before the Federal green light was given. So, the depression complicated the program of the Engineering Division as it did the others.

An explosive outbreak of milk-borne septic sore throat in a small western community which had insisted upon its right to enjoy the dangerous liberty of drinking raw milk was turned to good use elsewhere in the State. In the years which followed, numerous Massachusetts communities have adopted regulations for the pasteurization of all market milk so that more than 90% of the entire population of the State now enjoys safe market milk. In some areas cooperative pastuerization plants smoothed the way to the enforcement of municipal regulations.

Biologic Laboratory Branches Into New Fields

Once again the irresistible pressure of departmental growth made impracticable part-time administration, however competent, and Dr Rosenau resigned to give his entire time to teaching and research. The consolidation, improvement and expansion of the Antitoxin and Vaccine Laboratory's work was stepped up under Rosenau's successor, Dr. Benjamin White, who took over the direction on a full-time basis. Dr. White took a leading part in the Department's diphtheria control program, which was built about the production of toxin-antitoxin mixture and a state-wide campaign of education in its use. Thus, by the time diphtheria toxoid became available, a decade later, the recognition of the value of such a prophylactic agent was thoroughly established throughout the State. Later, as the pneumonia control program developed, higher types of antipneumococcic horse serum were added to the production schedule, with the subsequent development of therapeutic rabbit sera for pneumococcus typing reagents. The demand for therapeutic serum greatly expanded as its use became more widely understood, and sera for all types of pneumonia were made available, some by state purchase.

The scarlet fever control program of the Department was extended to include experimental production of scarlatinal streptococcus toxin and toxoid, and processing of convalescent serum obtained from—and returned to—certain cooperating towns and cities. Community participation in a convalescent serum program was difficult to maintain, due to the irregular occurrence of the disease in any one area, and this part of the program was ultimately abandoned. The experience gained, however, showed that the only logical way to organize a convalescent serum program was to place it on a larger population basis—thus ensuring more or less continuity in the supply and demand, and providing a central processing and distributing center on which any community could draw when in need.

Use of scarlatinal toxoid in preventing the disease has not as yet progressed beyond the experimental stage. Studies carried out by the Division of Communicable Diseases, based on one year follow-up Dick tests of individuals inoculated with toxoid, have shown an immunity rate considerably lower than that obtained, for example, with diphtheria toxoid; furthermore, the chemistry of scarlatinal toxin renders its detoxification a long and uncertain procedure. The problem remains one to which an answer is yet to be found. The work on scarlet fever led, however, to the development of methods for production of extremely high potency toxin and for titrating the toxin *in vitro* by means of a flocculation test.

Measures of Progress A fitting commentary on the ultimate effect of these two decades of departmental growth, from its inception in 1915, is the following summarization from a recent paper by Dr. Merrill E. Champion:

> "On looking back over the history of communicable disease in this State and the progress made in its control, certain things strike one at once. One is the virtual disappearance of smallpox in Massachusetts. No case has been reported in this State since 1932. It is reasonable to conclude that this result is due in large part at least to the fact that we have had for many years a law requiring vaccination of all children about to enter school. Unquestionably another factor has been the excellent vaccination practices of surrounding states.
>
> "Diphtheria, too, is a disease which has shown a startling diminution during the years that have elapsed since the creation of the State Department of Health. In 1915 there were 9,282 cases of diphtheria in Massachusetts with 720 deaths. In 1943 there were 140 cases of diphtheria with 11 deaths.
>
> "Typhoid fever in 1915 occurred in 2,204 cases with 246 deaths. The corresponding figures for 1944 were 32 cases and 1 death. On the other hand, it is only fair to say that some of the other communicable diseases follow a regular course with relatively little difference in the incidence from decade to decade. These are the diseases for which we have no specific preventive or treatment. As an example, one may mention measles of which 22,881 cases occurred in 1915 and 35,098 in 1943.
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> "This Department of Public Health like all others is still hoping for a feasible method of detecting those who are susceptible to poliomyelitis and for an effective treatment for this much feared disease. We have not yet discovered how to prevent meningitis although great advances have been made in the treatment of this disease. We have not yet been able to get the general public sufficiently health conscious to make possible the carrying out of various health procedures which we do know about. This is only another way of saying the State Department of Public Health and local boards of health as well as all private agencies interested in the promotion of public health still have plenty of room for expansion."

BENCH MARK 1936

New Functions Meet New Needs

Our last bench mark has two bases. One is a state activity, the other federal. This year saw the publication of the Report of the Special Commission to Study and Investigate Public Health Laws and Policies, a document which still influences the entire course of public health administration throughout the Commonwealth. Social Security, too, perhaps in a more tangible way, is fostering a broader program. So, it seems especially appropriate that we take our last bearings at this point.

The Report of the Special Commission is a remarkable document, the product of the painstaking study by the leaders of the profession. Its proposals deal with the whole range of urban and rural health administration by state and local agencies. In the depth of its research and the cogency of its proposals it is a fitting complement to the report of that First Special Commission, the famous Shattuck Report of 1850. Some of its recommendations for the betterment of local health administration have been made possible by federal grants through Social Security.

The broad intent of the Social Security Act is stated in its preamble:

> "To provide for the general welfare by . . . enabling the several states to make more adequate provision for aged persons, dependent and crippled children, maternal and child welfare, public health. . . ."

Specifically, the Act provides grants to be made to the states to aid maternal and child welfare activities, and for public health work generally, featuring aid in the development and maintenance of state and local services—among many other activities.

Charged with the administration of health provisions of the Act, the Federal Public Health Service determines the conditions under which grants to the states may be used in establishing and maintaining statewide and local health services. The regulations setting forth the type of community program for which financial aid might be expected were promulgated at the time of the Act's passage, and were approved by the Conference of State and Territorial Health Officers. Under the accepted plan, aid for local health services could be given *only* when the public health program of the city, county or district was under the direction of a full-time health officer. In addition, there should be such medical assistants, public health nurses, sanitary officers and clerks as would insure at least a minimum of effective health administration. Unfortunately, the communities in the Commonwealth with full-time health personnel and therefore eligible for Social Security allotments could be counted on one's fingers. By and large, these were the communities that least needed the aid which might be forthcoming from this source.

Throughout the State most of the towns still were served by a board of health composed of public spirited citizens who employed an agent, usually on a part-time basis, who might be assisted by the whole or part-time services of a public health nurse and a sanitary inspector. With the exception of the ten larger municipalities and one or two combined districts—at which we propose to look in a moment—local health administration in Massachusetts was in 1936 essentially at the same level of development that it was when Walcott guided the destinies of the Commonwealth's health administration in the "golden era."

Weaknesses in local health organizations had long been apparent to leaders in the field of public health. Earlier attempts had been made to remedy the most obvious defects, and a law permitting the voluntary joining of communities to form a combined health unit had been passed. One fault of the law lay in the fact that communities might join and leave such associations at will, a condition which precluded the possibility of assuring continuity of service and tenur of employment, which would make for competent administration. Despite the limitations of the law, there were instances in which communities had united to permit joint health services, but this did not alter the situation generally, which was one of serious weakness insofar as suburban and rural health is concerned. However, the Social Security funds did extend the life of these State-aided, combined health units.

Nashoba and Southern Berkshire Demonstrations Helped

For twenty years it had become increasingly apparent that the organization of local health activities was greatly handicapped by the inability of small political units to employ trained, full-time public health workers. As has been mentioned, towns had joined to provide for special public health services, by competent personnel, and it seemed logical that more completely functioning health units might be encouraged. In order to give this idea a satisfactory trial, the Commonwealth Fund of New York was invited to subsidize a five-year demonstration of town unions in rural areas in Massachusetts. With funds assured, one union was organized in Southern Berkshire County and another in the Nashoba Valley District of Middlesex and Worcester Counties. At first the health services were provided without expense to the towns. At the end of three years, when the communities were asked to begin a partial support of the program, the districts had to be reduced in size, for a third of the towns refused to contribute even a part of their proportionate share of the support of the unit and consequently withdrew. By the time the Commonwealth Fund demonstration was completed, Federal allotments through the Social Security Act providentially became available and the demonstration was enabled to continue for a further trial. Later the Southern Berkshire District had to be disbanded because additional towns could not be induced to join it and the population then served was insufficient to make the unit self-supporting. The Nashoba Valley District continued to function but with only ten towns having a total population of 17,000, until the wartime shortage of medical officers resulted in the inability to fill the position of medical director. On a restricted basis the union continues without a medical officer, even though the subsidy was withdrawn.

The only joint service on a county-wide basis which has persisted despite the weaknesses of the permissive State law is the Barnstable County Health Department on Cape Cod. Serving a relatively small population, this agency was never able to carry out a full administrative program, but the advent of Federal funds through the State Department did permit an increase in the services which it renders to the towns of Cape Cod. Despite the new financial support, the county unit stumbles along because the town boards of health retain all their powers except those they willingly delegate to the unit and because they employ personnel independently of the county unit they must decide each year, whether to remain within or to leave the administrative union.

Though the Social Security Act may have accomplished less in the improvement of Massachusetts local health administration than its sponsors hoped—largely because Yankee love of autonomy conflicts with desire for competent full-time administration—the Act did implement an immense increase in the volume and variety of services rendered to the Commonwealth by the State Department of Public Health. Some measure of the influence of the Social Security Act may be gained from glimpses of the activities of the various divisions of the Department undertaken in the years following its passage. To Massachusetts came new funds equal to about half the total public health budget of 1936—exclusive of the support of the tuberculosis and cancer hospitals.

Child Health Services Markedly Expand

In the Child Hygiene Division the professional staff was doubled. Where one well child conference unit had tried to cover the State previously, two now were made available. The well child conference unit was increased to comprise a pediatrician, a public health nurse, a dental hygienist, and a nutritionist. This team of professional people visits designated communities in the State to give a practical demonstration of the complete infant and preschool program. In anticipation of the team's visit, the public health nurse of the district enlists the support of a local committee which arranges for the pre-conference publicity, provides transportation of families to the clinic and generally holds itself responsible for the attendance. For both the child and his mother the conference is a unique experience and the community enjoys a continuing benefit, for the local nurses are charged with the duty of following-up the findings of the clinic team. They seek to have physical defects corrected, and enlist professional support in curing faulty habits. Most important of all, by this practical means, the town is led to see the need for locally conducted well child conferences, the local committee being responsible for the continuance of the service. Thanks to the new funds, twice the number of communities profit from these demonstrations.

It is manifestly impracticable to tell in detail of all the augmented administrative activities of the Division of Child Hygiene. They are, however, three projects which demand our attention at this point in our history. The first of these was an attempt to find a complete plan for testing the eye and ear functions of young children in order to overcome learning handicaps. A new testing mechanism, adapted for children, was evolved and the results of this project are so satisfactory that the approval of the Massachusets Vision Test was given by both the Public Health Council of the Department and the Council on Physical Therapy of the American Medical Association. Its introduction into the schools of the State followed, and it is finding its way into institutions throughout the country, even to the United States Army and Navy. Following the vision testing studies have been made of children's hearing, and the outcome of these studies has been the development of tests which are still in process of standardization. These two tests should go far toward removing remediable handicaps in young children.

The second project was a new service. The marked decrease in infant deaths focused attention upon premature births which remained one of the unsolved problems of infant mortality. Concerted attack upon the problem led to an immediate reduction in the rates which promises to be lasting. In each of forty-eight centers in the Commonwealth, hospital facilities for the immediate care of prematurely born babies were established and an ample equipment of warmed carrying baskets was made available through local boards of health. Public health nurses then demonstrated that any "premie"—anywhere in the State—could be carried without delay or exposure from home to hospital.

The last of these new activities is a joint service carried on by the Department of Public Health and of Education. A School Health Council composed of the Commissioners of Public Health and of Education and of certain members of their staffs was created and charged with the effort to improve school health programs. This heart-warming example of productive collaboration between two State Departments is especially worthy of note. Federal funds permitted the employment of a trained staff to carry out an ambitious health education program looking to the preparation of teaching units in the elementary and secondary schools. The workshop method was adapted to the health field and by it teachers were induced to evolve practical programs to meet the particular needs of their own classrooms.

Adult Hygiene Evolves Educational Techniques Cancer control activities celebrated a tenth anniversary in 1936, the first clinic having been opened a decade earlier. In this and the others which had been organized in rapid succession to offer diagnostic facilities, a novel educational program was begun when Social Security funds became available. Its objective was to give exact knowledge to individuals gathered in small groups to be addressed by an authority in the person of a local practicing physician. To make this plan a reality in a state of more than 350 communities, having a total population of nearly four and a half million, and served by more than seven thousand physicians, was no mean task. In each town—or city neighborhood—a committee composed of representatives from every local organization was formed. The recruiting of the committees was done by the personnel of the Division of Adult Hygiene. These committees differ from most local health councils chiefly in that they are not selective or limited to groups or classes, but represent every level of interest in the community—religious, service, political, labor and racial groups. Each club or association represented on the committee is asked to agree to devote one meeting a year to a talk on cancer. A local physician is asked to be the teacher in this program because the early detection of cancer is in his hands. He knows the community in which he lives and it is the duty and right of a physician to teach.

Tuberculosis Preventive Services Rounded-Out Looking always to the control of tuberculosis, construction of State, county and municipal sanatoria proceeded steadily after the establishment of the Rutland Sanatorium until Massachusetts enjoyed the distinction of being numbered among the few States which could furnish nearly three beds for each annual tuberculosis death: authorities in this field having set two and one half beds per annual death as the objective to be attained. When one of the two sanatoria devoted to the care of tuberculous children during the Chadwick clinic program was found to be no longer needed for that purpose, Westfield Sanatorium was rebuilt and facilities for treating adults for both tuberculosis and cancer were provided in the new building. The long hospitalization required for patients with extra-pulmonary forms of tuberculosis as well as their special needs had made them step-children at the established sanatoria and unwelcome guests in general hospitals. On the recommendation of a special commission, Lakeville Sanatorium was therefore converted into a hospital exclusively for the treatment of these patients. So, at least, the modern treatment of tuberculosis in all its forms was fully available. Later the Department was authorized by the legislature to admit cases of infantile paralysis to the Lakeville State Sanatorium.

Another pioneering activity of the Department is the hospitalization of a limited number of patients with chronic arthritis. For a number of years the demand had grown for a new State hospital to be devoted solely to the care of medically indigent rheumatic patients. At the suggestion of the Department, and in response to this demand, the legislature authorized a study of the whole problem of the prevention and treatment of chronic arthritis in one of the large metropolitan hospitals. The Department, then contracted with the Massachusetts General Hospial for the care and study of not over twenty patients at a time. Besides furnishing treatment for a substantial number of medically indigent patients, this project is providing invaluable findings on which to base further measures for the prevention and treatment of this most disabling of chronic diseases.

Control of Venereal Disease Achieves Divisional Status The year 1936 was marked by an event of far-reaching import to the campaign for the control of the venereal diseases. An article by Surgeon General Thomas Parran, U. S. Public Health Service, entitled "Why Don't We Stamp Out Syphilis?" appeared in a popular magazine. This challenging question lifted the lid of censorship that had so long been clamped upon any discussion of the venereal diseases outside the scientific press and aided greatly in speceding up state programs everywhere including that of the Massachusetts Department of Public Health. Here, the venereal disease control services were changed from a sub-divisional status under Communicable Diseases, and the Division of Genitoinfectious Diseases was established.

Social Security funds permitted an immediate expansion of all activities, and efficient full-time case follow-up for the clinics—which had previously had only part-time service or none at all—was typical of the changes effected. Clinics and practicing physicians were supplied with arsenicals and the heavy metals (more recently the sulfonamides and penicillin were added). Treatment centers were improved and new ones organized as experience indicated their need, and the General Court amended the law to permit the State Department of Public Health to support existing clinics for the treatment of venereal diseases. Though the estimated total cost of treatment and services for syphilis and gonorrhea under this plan reached two-hundred thousand dollars a year, the financial burden could now be assumed by the Commonwealth.

Patients no longer had to be identified to local boards of health in order to receive free treatment. It was also possible now to employ an epidemiologist—"female"—to give full-time attention to the follow-up for syphilitic pregnant women. Educational work was greatly accelerated, new literature was made available for distribution, and a lecture service was organized and radio broadcasting stepped-up. In anticipation of the Selective Service Act, plans were made with the U. S. Public Health Service and the military and naval authorities to meet the emergency involved in the military training of the National Guard and the civilian units at training camps throughout the Commonwealth. For the first time all selectees were examined serologically for syphilis and as a result of these tests, Massachusetts was found to have the second lowest syphilitic rate in the country. All infected men were followed-up to see that they received proper treatment.

Crippled Children, Hospital Licensure, E. M. I. C., Et Al The variety and complexity of the independent activities undertaken by the Department of Public Health since the passage of the Social Security Act reflect in some measure the administrative burdens which present-day public health practice is imposing upon both State and municipal health departments. Simply to list a few of the State Department's new activities—services for crippled children, hospital licensure, dental research and the Emergency Maternity and Infant Care Program—will suggest even to the casual reviewer something of the versatility which the modern health administrator must possess.

Social Security funds enabled the Department of Public Health to expand and improve the limited services for crippled children which had been given since 1925 at the Lakeville Sanatorium. The new services could not be placed on a statewide basis and the definition of a crippled child was broadened so that practically all physically handicapped children who are medically indigent could be cared for. As the Department could not successfully carry out such a program of medical care without the active and sympathetic participation of the practicing physicians of the State, detailed plans for this service were presented to each of the district medical societies throughout the Commonwealth. Though this procedure took several months, it was well worth the effort and the time, for it earned the good will of the members of the Massachusetts Medical Society.

Physiotherapists and Social Workers Assigned to Districts The first clinic center for crippled children was established at Pittsfield late in 1936 and before the year was out ten others were under way. During this developmental period, all activities of the field staff were supervised administratively and technically by the central office. As a result, these highly specialized services were rendered independently of other activities of the Department. Consequently, the staff of "Crippled Children" often were unaware of other departmental activities and many of the State Department's other professional workers did not know what was being done for crippled children. More important still, the children themselves and their families did not receive the assistance of other departmental specialists such as public health nurses and nutritionists. This condition was corrected as soon as the health districts were reorganized, when the field staff of the Services for Crippled Children was transferred to these district units so that complete care of the crippled child became an integral part of departmental activities.

More than three thousand children have been accepted for care, nearly two-thirds of whom have been discharged because their crippling condition had been removed or improved, or because they had reached the age of twenty-one. There are now in excess of eleven hundred children on the active list and this number seems to have reached an equilibrium, the number of children discharged being about equal to the number admitted each year. Appliances have been liberally provided and all needed physical therapy treatments have been given. The children under the care of the service have had the unlimited aid of the public health social workers. As a result of this effort, and the work of the many non-official agencies rendering aid, no handicapped child need go untreated. Ample resources are available for the care of every needy child. Vigorous effort is made to locate untreated crippled children but few are now being found.

Medical Social Service Prospers The growth of medical social service in the Department tells its own story. In the dim past when Chamberlain-Kahn funds were briefly available for venereal disease control activities, one medical social worker had been rather gingerly employed. The value of her services was so evident that she stayed on when Federal funds were no longer available. Then, when Dr. Bigelow became Commissioner, he appointed a supervisor of social service directly responsible to him—his goal, apparently, to develop a general service available to any division whose director might have the foresight to use it. The new supervisor began her work in the field of cancer, which was then being cultivated to meet the social needs of the patients in the State-aided clinics, and as the first fruit of her effort, a full-time, resident social worker was appointed for the Pondville Hospital. A year or two later we find two assistant social workers assigned to help meet the needs of this institution.

Next, tuberculosis was to visualize the need of social service. Concerned about the long lists of patients awaiting admission to sanatoria, and particularly the number of persons seeking readmission, the Director of the Division asked for a social worker to assist with the solution of these problems in tuberculosis control. Two had been appointed in 1929. But it was at the time that State aid for crippled children was organized that the liveliest need for social service became fully evident. At first, only two qualified workers could be found; now there are many. Curiously enough, the most recent use of social services in a field where the need has long been felt seems to have been in one of the longest established projects, the child hygiene program. One worker was appointed in 1940 to survey the social needs, to consult with the local nurses and nursing agencies, and to participate in the teaching program. The point to be noted is that up to this time medical social service had been offered on a specialized basis. Then a radical change was made; all social workers except those in the institutions were officially assigned to the district offices for generalized service.

Space permits only a sampling of the variety of functions of the Dental Hygiene Bureau. Oral hygienists inspect the teeth of preschool children at the well child conferences; school surveys to show dental deficiencies are made upon request; lectures on dental health are given at all State teachers colleges, at the Tufts Dental College and Harvard School of Public Health. More recently the Dental Hygiene Bureau has numbered among its diverse activities licensing of dental clinics, the Victory Dental Corps Program—which has promoted dental care for "high schoolers" during wartime—and the beginning of a five-year study of the result of the topical application of fluorine to children's teeth. As an example of the strange combinations which intradepartmental cooperation may induce, we find the sewage experimental station staff collaborating with the oral hygienists. For, parallel with the Dental Bureau's study of fluorine, the Experiment Station has developed a chemical water analysis for fluorine which requires only about 5% as much time as other methods. This test will make it possible for the Department to contribute its help to research if fluorine continues to arouse as much scientific interest as it does at present.

Public Health Nursing Systematized

Through the years public health nursing suffered a Topsy-like growth. In the early days, nurses—usually called health educators or assistants to the district health officers—were employed by one division or another as the need became apparent.

Some hint of the variety of activities which, in one way or another, became a part of public health nursing in the early days may be caught in the reminiscent comment of Miss M. Gertrude Martin, R.N., who alone of the original eight assistants to the district health officers appointed in 1918, remains in the Department. In their districts the public health nurses promoted the Department's many faceted communicable disease program through their inspired educational efforts. They knew their communities, and from their knowledge they formulated practical programs of generalized nursing service. They knew the nurses of their communities too, and visited with them in the homes, reviewing with them their achievements and problems. When "health weeks" were called for, the district nurses did the "leg work"; they arranged exhibits, gave talks, and saw to it that the press did not allow the "week" to go unnoticed. Well child conferences, tuberculosis diagnostic clinics, diphtheria immunization clinics and the like, all made their demands upon the "willing and able" services of the Department's public health nurses.

When the legislature handsomely opened the public purse for health work in the early twenties, the State was districted for public health nurses but their assigned areas bore little relation to the territories of the health officers. The nursing districts became smaller and smaller as the nurses increased in number, but this type of organization left much to be desired from the point of view of efficiency. When Social Security funds became available the entire district administration was reorganized. The nursing staff increased to seventeen, of which eight supervisory nurses were assigned to the district health offices and a generalized nursing service undertaken.

Hospitals Are Licensed

Soon after the legislature enacted a law authorizing the Department to license hospitals and sanatoria, an Advisory Committee consisting of practicing physicians, hospital administrators and trustees was appointed. With the aid of this committee, regulations for the various phases of hospital management were established which, with the rules of the State Department of Public Safety, have done much to improve conditions under which the hospitals of the State are conducted. No hospital is licensed until it has been inspected by the Department representatives, certified by the local board of health as suitable, approved by the Department of Public Safety from the standpoint of accident hazard and fire protection, and by the Division of Sanitary Engineering of the Department of Public Health from the standpoint of water supply and sewage disposal. One of the beneficient results of this program has been the closing of a number of institutions which were entirely unsuitable for hospitals, or their conversion into nursing homes. In other instances hospitals which most surely would have been unfit have been prevented from opening. At the same time, it has been possible to encourage the establishment of hospitals where they were needed in communities otherwise without such facilities. All out-patient departments and clinics associated with hospitals are similarly inspected and licensed by the Department.

Physicians and Department Collaborate for E.M.I.C.'s Success

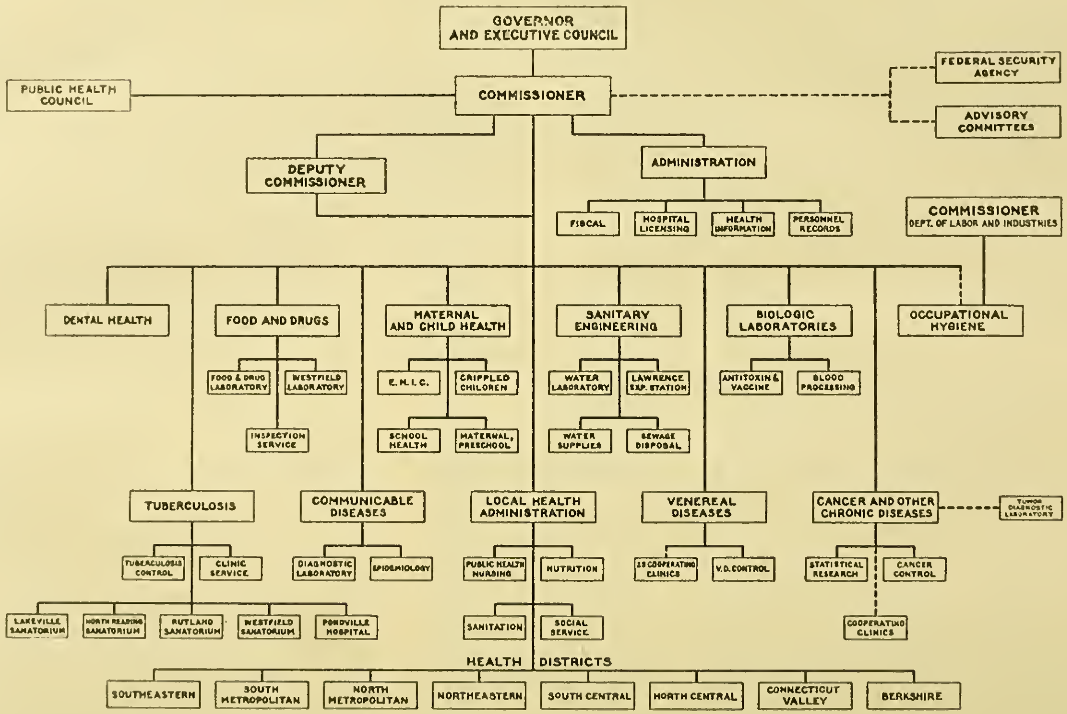
Certainly not least in its potentialities for far-reaching consequences—though listed last—is EMIC. Emergency Maternity and Infant Care, as planned by the Division of Child Hygiene and in conformity with the rules and regulations of the Children's Bureau of the United States Department of Labor, includes free prenatal, delivery, hospital, and postnatal care for the wives and infants of servicemen in certain pay grades. Throughout its history, the Division of Child Hygiene had meticulously limited its activities to guidance of parents of well children, studiously avoiding all matters of medical diagnosis and treatment, but now the Division found itself almost overnight deep in the ramifications of public medical care. The decision to adopt this program precipitated on the Department an avalanche of applicants. For the first week it took practically the entire time of all the staff of the Division of Child Hygiene, just to answer the questions of applicants who came to the State office in person. For the first month hundreds continued to come—many prospective mothers applying personally, accompanied by husbands in uniform. Indeed, so many in the last days of pregnancy continued to appear that an emergency obstretical kit was kept handy in the Division office. During the first thirty days more than two thousand applications were received, and during the first year a level of more than fifteen hundred per month was maintained steadily. Approximately two thousand physicians and one hundred and thirty-three hospitals in the Commonwealth cooperated in this program during its first year. Two technical committees—one in pediatrics and one in obstetrics—are given assistance of the greatest value not only in the formulation of this program but in directing its policies.

Local Health Administration—Newest Child of Departmental Family

The last change in departmental organization, which the Federal grant made possible, is the establishment of a Division of Local Health Administration. This Division is the inevitable outcome of the growth of the field activities of the Department. Through the years of growth each of the divisions employed more and more field workers who went about independently into local communities, each responsible only to his own division director. Often the district health officer had not even known of the visit. Sometimes local communities had found themselves in that distressing dilemma in which one State worker had recommended one mode of action and another had recommended a conflicting method. This unhappy situation was relieved when steps were begun to assign field personnel to districts and to place them under the supervision of the district health officer. In 1943 this realignment was accelerated and all eight districts were reorganized with administrative, professional and clerical staffs—all responsible to the Division of Local Health Administration.

A new position, that of district sanitary officer, was also made possible by Social Security funds. His duties are to work directly with local boards of health and local inspectors on problems of environmental sanitation—refuse and garbage disposal, private water supplies and private sewage treatment, milk sanitation and the inspection of eating places. As soon as appointments can be completed, district sanitary officers will be assigned to each of the eight health districts.

MASSACHUSETTS DEPARTMENT OF PUBLIC HEALTH ORGANIZATION



July 1, 1946.

Vlado A. Getting, Commissioner.

In the realignment of the health districts, several factors were taken into consideration; among them, total population in communities over 25,000, local health facilities, lines of transportation and area in square miles. The district health officers are assisted by a basic professional and clerical staff consisting, in general, of a public health nursing supervisor, an infant welfare field nurse, a sanitary engineer, a sanitary officer, a physiotherapist, a medical social worker, a public health education worker, a nutritionist and several clerk-stenographers. The district health officer, as representative of the Commissioner, is responsible for the entire program of the Department in his district. Who will challenge our assertion that this community localization of State health services is the most efficient, and should prove the most potent, influence for improving local health department programs?

The story of today is tomorrow's history. This recounting of the long years of service rendered to the Commonwealth by the Department during its three-quarter century of life, would not be complete without some final comment upon its present activities. Anyone who has followed this story to this point, and who is at all familiar with public health administration can create his own picture of the Department at work today by glancing at the accompanying organization chart.

The organization chart testifies to the diversities of the day-to-day activities of the State Department of Public Health, but broad as is the coverage of its services, simply to list all the divisions and bureaus fails to picture the unusual functions which the complexity of modern living has placed at the door of the Department.

A comparison of the two charts—1915 and 1946—indicates some of the changes made in the organization of the Department. Since the time of the reorganization of 1915, its activities have more than doubled. New officers were appointed and new divisions created from time to time without complete coordination of their activities, and with the passage of the years arrangements originally beneficial have proved no longer of value, so it became necessary to alter these relationships. It seemed wise to change the names of some of the divisions, as will be noted in the charts.

Sanatoria and Tuberculosis Merely to name the five great hospitals which the legislature placed under the direction of the Division of Sanatoria and Tuberculosis is sufficient to portray the extent of the administrative obligations imposed upon this Division. But it performs many more services to the Commonwealth than these administrative activities. Conspicuous among them are the mobile and portable X-ray units, by means of which industrial employees, high school students and teachers—among other groups—are given chest X-ray examinations. More than one hundred thousand persons are given the benefit of these examinations each year. Although many active cases of tuberculosis are found through these industrial surveys, many tuberculous persons so found refuse sanatorium care because of wartime demands for labor and the temptations of high wages. These people injure themselves, their families and their associates. Follow-up services to persuade reluctant patients to care for themselves and to induce persons in contact with open cases to protect themselves are some of the collateral activities growing out of the industrial services.

Administration Under the Division of Administration are two bureaus which are essentially new in their present programs. In the Bureau of Health Information are centralized all the diverse activities which go to make up the present day public health education program. In addition to the preparation of the accepted visual aids which state departments employ in health promotion, the Bureau has initiated health education programs in junior and senior high schools when this promotional service has been requested. In addition to the usual services which a health library carries out, the Department library—which is a part of this Bureau—acts as an agency for supplying new and unusual material to the district offices.

The Hospital Licensing Bureau has extended its inspection and licensing function of dispensaries and clinics as well as to the hospital, for the improvement of which this Bureau was originally created.

Biologic Laboratories Celebrating its fiftieth anniversary in conjunction with the Department's seventy-fifth, the Division of Biologic Laboratories enters now upon its second half-century of service, continuing to produce its familiar list of biologics even though military demands have curtailed its personnel. In addition to the manufacture of vaccines and serums for physicians and institutions of the State, the Laboratory plans to undertake the important function of processing blood and providing plasma and fractions of plasma, which war experience has shown to be of such great preventive and therapeutic value.

Cancer and Other Chronic Diseases The new divisional designation is a more realistic name than "Adult Hygiene" by which this Division was called. In addition to the State cancer clinics, which continue to enjoy an increasing attendance from year to year, and the tumor diagnostic service which also grows in scope, the Division has undertaken a series of cancer symposia in different sections of the State—the first project of this kind to be carried out on a local basis in the United States.

The effect of the fifteen-year old cancer preventive program may be measured by the average interval between the onset of the first symptom of cancer and the first visit of the patient to the physician. Twenty years ago the interval between onset and first visit was over six months. Today it is three months. The thesis of this division is that the interval can, and will, be further reduced when the public is led to accept the teaching that the sooner the doctor can give treatment, the better is the chance of cure.

Local Health Administration Youngest of all the Department's family, having been created in May of 1944, is Local Health Administration. Some measure of the complexity of its activities will be gained from a review of the recent organization chart. Not only is this Division charged with the administration of the eight district offices, but it is responsible for the five bureau activities of Dental Health, Public Health Nursing, Nutrition, Social Service, and Sanitary Inspection.

The activities of the Nutrition Bureau are concerned with the giving of advice to local nutritionists, but in addition assistance is given to municipalities for the improvement of school lunches, nutritional education programs and the training of new workers.

Generalized public health nursing has long been the goal of Nestors of public health, but the generalized medical social service program of the Social Service Bureau is unique. The State Department's experience has revealed that the results achieved by the medical social worker can be greatly enhanced through the cooperation of other staff members of her district. Local health and social agencies call for the services of these workers whose interests cut across such divisional activities as tuberculosis, crippled children services, maternal and child health, cancer and venereal diseases.

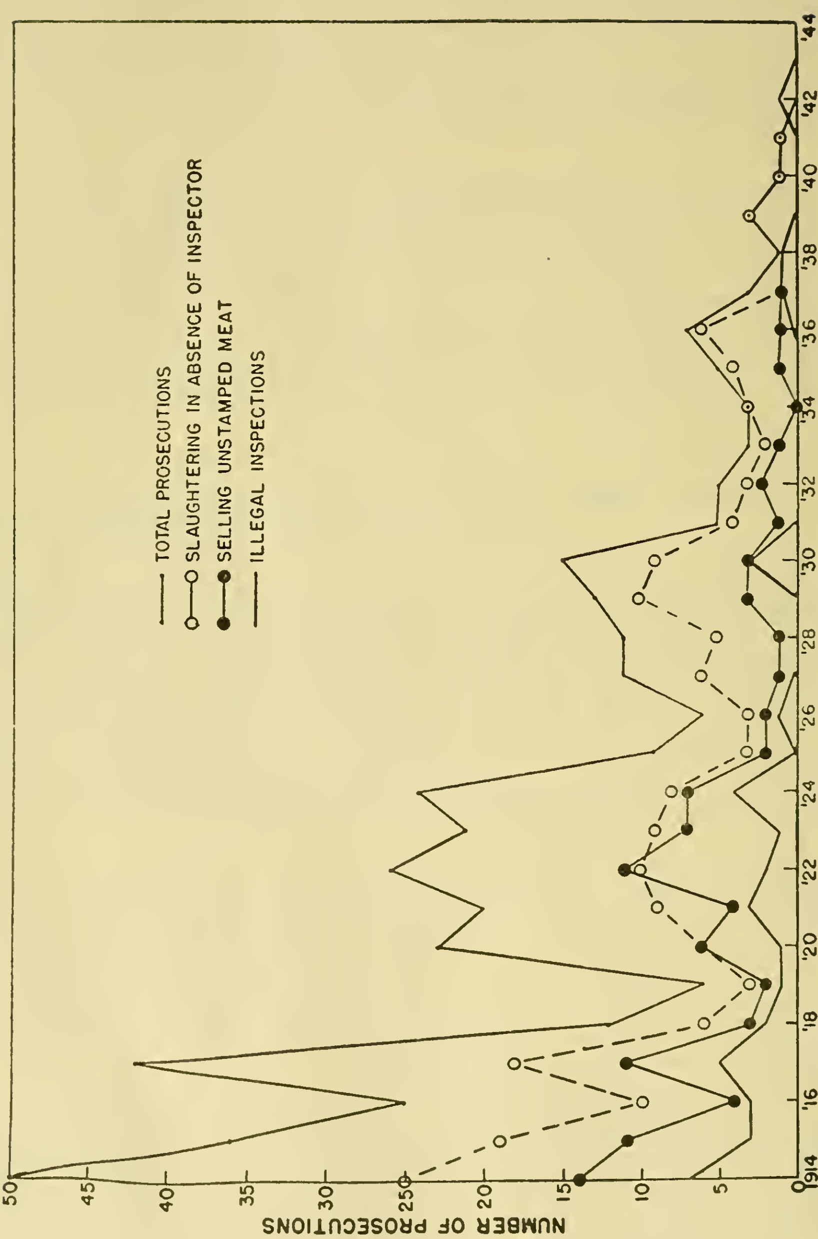
Venereal Diseases To its conventional tripod—clinic service, casefinding and education—the Venereal Disease Division, newly released from "Genitoinfectious Diseases," has undertaken promising ventures in the field of research. Penicillin is distributed to the cooperating clinics and certain hospitals throughout the State. Standards of treatment with the new drug for both gonorrhea and syphilis have been promulgated and a study of the collected experience of the several agencies should add to our knowledge of the therapeutic value of penicillin. Gonococcal culture service also is extended to all physicians in the Commonwealth.

Communicable Disease In addition to the continuing epidemiologic aid to local boards of health which the name "Communicable Disease" implies, the division, handicapped as it has been by the loss of professional personnel to the armed services, has carried on two noteworthy activities. One has been the laboratory approval program by which local laboratory performance throughout the State has been greatly improved. All laboratories which examine specimens from cases of communicable disease may come voluntarily under this supervision. Associated with this as a collateral activity is the establishment of refresher courses for laboratory technicians; the course being given at the Pratt Diagnostic Hospital and supported by the Commonwealth Fund. Each year twenty students selected by the Division receive this training, and this program, too, has done much to improve laboratory performance.

Maternal and Child Health The change from the earlier name of "Child Hygiene" to that of "Maternal and Child Health" makes the title descriptive of the broad program of this division. E.M.I.C. is but one of the newer activities. In less than a year and a half fifteen thousand applications for maternity and pediatric care were processed, and by the end of the year 1944 over a million dollars had been expended in the Commonwealth for the care of wives and children of servicemen.

Services for Crippled Children, recently transferred to the Division of Maternal and Child Health, continue to increase in volume and effectiveness. The outbreak of anterior poliomyelitis was responsible for part of the current increase, but much is due to the continuing search throughout the State for children needing care. The field staff for Crippled Children Services, consisting of six physiotherapists, a supervisor of public health nursing, a supervisor of speech therapy, the part time of six public health social workers, gave a total of over thirty-five hundred treatments and made over forty-three hundred visits pertaining to the welfare of these patients.

PROSECUTIONS FOR VIOLATION OF MASSACHUSETTS SLAUGHTERING LAWS



Sanitary Engineering The mention of the words "environmental sanitation" visualizes enormous numbers of water examinations completed, inspections of water and sewage treatment plants made, and stream surveys to detect pollution carried on throughout the State. But the present-day program of the Division of Sanitary Engineering covers a far wider range. Plans are approved for new water supplies and sewage disposal plants. The Division, among a host of other activities, investigates offensive trades, collects water samples from bathing beaches in the Metropolitan area, inspects waters where shellfish are grown, approves or prohibits the taking of shellfish from coastal waters depending upon whether they are safe or polluted. The oldest Division continues among the leaders in volume of services rendered.

Food and Drugs Examinations of samples of milk, food and drugs, and the sanitary inspection of bakeries, soft drink plants, ice cream factories and pasteurizing plants, are the type of service one anticipates of the Division of Food and Drugs. It does all these well, but it carries on a wide variety of other examinations. The days are none too long to find time for court cases, dissuading venturesome souls from endangering health and life, and protecting the public from human carelessness. Among its unusual activities is the biological assay of Vitamin D in milk and of other vitamins in a variety of foods and drugs. That a goodly proportion of samples examined is still found deficient in the claimed vitamin content is an indication of the need for this venture in food and drug control.

Although this story may seem to the reader unnecessarily detailed, no written account, however long, can do justice to the work of so wide-ranging an agency as the Massachusetts Department of Public Health with its fifteen hundred employees scattered from Barnstable to Berkshire. Really to know the Department it is necessary to "come and see" it. That is the invitation that the Department extends to all who collaborate with it.

APPENDIX I

EXCERPTS FROM:

REPORT

of a

GENERAL PLAN

for the

PROMOTION OF PUBLIC AND PERSONAL HEALTH

Devised, Prepared and Recommended

by the

COMMISSIONERS
Appointed Under a
Resolve of the Legislature of Massachusetts
Relating to a
Sanitary Survey of the State

Presented April 25, 1850

Boston:
Dutton & Wentworth, State Printers
No. 37, Congress Street
1850

Report of the Commissioners

The Commissioners appointed on the third day of July last "to prepare and report, to the next General Court, a plan for a Sanitary Survey of the State, embracing a statement of such facts and suggestions as they may think proper to illustrate the subject," have considered the matters referred to them, and submit their Report.

We believe that the conditions of perfect health, either public or personal, are seldom or never attained, though attainable; that the average length of human life may be very much extended, and its physical power greatly augmented; that in every year, within this Commonwealth, thousands of lives are lost which might have been saved; that tens of thousands of cases of sickness occur, which might have been prevented; that a vast amount of unnecessarily impaired health, and physical debility, exists among those not actually confined by sickness; that means exist, within our reach, for their mitigation or removal; and that measures for prevention will effect infinitely more, than remedies for the cure of disease.

But whom does this great matter of public health concern? By whom is this subject to be surveyed, analyzed, and practically applied? And who are to be benefited by this application? Some will answer, the physician, certainly. True, but only in a degree; not mainly. It will assist him to learn the causes of disease; but it will be infinitely more valuable to the whole people. The people are principally concerned, and on them must depend, in part at least, the introduction and progress of sanitary measures.

In a subject of such vast importance, on which so little is generally known, and so much ought to be universally known, and which is so full of interesting and useful illustrations, it is difficult to confine ourselves within the limits of a single report of reasonable length. Yet, in our judgment, it would be unworthy of Massachusetts, under whose authority we act, and it certainly would be unsatisfactory to ourselves, if we failed to make the attempt, at least, to present the subject so that the people of the state may know what we mean; so that they may be able, if they choose, to carry our recommendations into practical operation; and so that, if thus applied they will add to their physical power and increase their intellectual, social, and personal happiness.

It should be born in mind, however, that this report is designed to suggest a plan for a sanitary survey of the state, and not to contain the survey itself. We were authorized, however, by the resolve, to embrace a statement of such facts and suggestions as we might think proper to illustrate the subject. We have accordingly been at no inconsiderable labor and expense to obtain the most recent authentic information concerning the history and present condition of the sanitary movement; and we shall proceed to give some of the results of the investigation, before presenting our plan for a sanitary survey of this state.

The Sanitary Movement at Home

Sanitary Police. Some historical notice of the sanitary legislation of Massachusetts seems proper, preliminary to any statements of its present condition. The subject seems to have received little attention from the General Court, during the old colonial charter. Two acts, which have some relation to it, we shall presently notice. Laws were passed by the provincial government, relating to nuisances, drainage, smallpox, and some other matters; many of which were special acts, or partial in their operation. But though imperfect, they are honorable to the state, and exhibit the care which the Legislature has ever wished to exercise over the people. To them we have been indebted for many excellent sanitary municipal regulations which have continued until the present time.

Nuisances. In 1692 and 1708, acts were passed, providing that "in Boston, Salem, Charlestown, respectively, and other market towns in the province," "slaughter-houses for killing of meat, still-houses, and houses for the trying of tallow, currying and dressing of leather be assigned by the selectmen to places where it may be least offensive," and prohibited elsewhere. The Revised Statutes modified this act, and extended its provisions to any town in the state, at the option of the selectmen, and included "any trade or employment offensive to the inhabitants, or dangerous to the public health."

Drainage and Sewerage. In 1702, an act was passed providing "for appointing commissioners of sewers, for the draining and removing of the banks and obstructions of the passage of waters in rivers, brooks, or ponds that occasion the overflow and drowning of meadows and low lands; and also for the draining and flowing of swamps and other unprofitable grounds, and drying of them."

Sickness. Legislation on this subject, principally with reference to the smallpox, has been frequent in the history of the State. As early as 1701, "an act providing in case of sickness," was passed, "for the better preventing the spreading of infection."

Quarantine. In 1700, the masters of ships were required to furnish a list of all passengers to the selectmen of towns, and give security for the support of any "impotent, lame, or infirm person" who might be discharged. At a subsequent period, not exactly known, a hospital was erected on Spectacle Island, by the town of Boston; in 1799 the whole quarantine regulations were transferred to the Boston Board of Health; and there it rested, as it always should have done, until the Revised Statutes were passed.

(After reviewing a tragic century of epidemics of smallpox, cholera, scarlet fever, typhus, and yellow fever, all of "uncommon malignity" this section concludes with these paragraphs:)

It is proved that causes exist in Massachusetts to produce premature and preventable deaths, and hence unnecessary and preventable sickness; and that these causes are active in all the agricultural towns, but press most heavily upon cities and populous villages.

It is proved that measures,—legislative, social and personal,—do not at present exist, or are not so fully applied, as they might be, by the people, for the prevention, mitigation, or removal, of the causes of disease and death.

It is proved that the people of this state are constantly liable to typhus, cholera, dysentery, scarlatina, smallpox, and the other great epidemics; and to consumption, and the other fatal diseases, which destroy so many of the human race in other parts of the world.

It is proved that the active causes of disease and death are increasing among us, and that the average duration of life is not as great now as it was forty or fifty years ago.

PLAN FOR A SANITARY SURVEY OF THE STATE

We now proceed to give an outline of a plan for the Sanitary Survey of the state which we propose for adoption.

Our plan consists of a series of measures, which may be rendered permanent if desired, presented in the form of separate recommendations. They are divided into two classes, and are to be regulated and controlled by the agencies which are proposed to be established; one by the legislative authority of the State, and the municipal authorities of towns and cities, and the other by social organization and personal action. Some of these measures are of great magnitude, and would each furnish matter for a volume, if fully explained and illustrated. All we propose to do in this connection is, to name and define each, and to give a brief explanation and illustration of its character and design. These measures, it must be recollected, however, are only a series of plans by which a sanitary survey might be carried forward. The accompanying information is inserted merely to illustrate these plans.

STATE AND MUNICIPAL MEASURES RECOMMENDED

We recommend that the laws of the state relating to Public Health be thoroughly revised, and that a new and improved act be passed in their stead.

We recommend that a general Board of Health be established, which shall be charged with the general execution of the laws of the state, relating to the enumeration, the vital statistics, and the public health of the inhabitants.

We recommend that the Board, as far as practicable, be composed of two physicians, one counsellor at law, one chemist or natural philosopher, one civil engineer, and two persons of other professions or occupations; all properly qualified for the office by their talents, their education, their experience, and their wisdom.

We recommend that a local Board of Health be appointed in every city and town, who shall be charged with the particular execution of the laws of the state, and the municipal ordinances and regulations, relating to public health, within their respective jurisdictions.

We recommend that local Boards of Health endeavor to carry into effect all their orders and regulations in a conciliatory manner; and that they resort to compulsory process only when the public good requires it.

We recommend that the successive enumerations of the inhabitants of the state be so made, abstracted, and published, that the most useful and desirable information concerning the population may be ascertained.

We recommend that the laws relating to the public registration of births, marriages, and deaths be perfected and carried into effect in every city and town of the state.

We recommend that, as far as practicable, there be used in all sanitary investigations and regulations, a uniform nomenclature for the causes of death, and for the causes of disease.

We recommend that the local Boards of Health provide for periodical house-to-house visitation, for the prevention of epidemic diseases, and for other sanitary purposes.

We recommend that measures be taken to ascertain the amount of sickness suffered in different localities; and among persons of different classes, professions, and occupations.

We recommend that the causes of consumption, and the circumstances under which it occurs, be made the subject of particular observation and investigation.

We recommend that nuisances endangering human life or health be prevented, destroyed, or mitigated.

We recommend that a sanitary association be formed in every city and town in the state, for the purpose of collecting and diffusing information relating to public and personal health.

We recommend that public bathing-houses and wash-houses be established in all cities and villages.

We recommend that, whenever practicable, the refuse and sewage of cities and towns be collected, and applied to the purposes of agriculture.

We recommend that local Boards of Health, and others, interested, endeavor to prevent the sale and use of unwholesome, spurious, and adulterated articles, dangerous to the public health, designed for food, drink, or medicine.

We recommend that institutions be formed to educate and qualify females to be nurses of the sick.

We recommend that persons be specially educated in sanitary science, as preventive advisers as well as curative advisers.

We recommend that parents, and others to whom the care of those in infancy and childhood are entrusted, endeavor to understand and discharge their duties so that a good foundation may be laid for vigorous manhood and old age.

Reasons for Sanitary Survey

The sanitary reform we advocate is not like some of the popular reforms of the age. It rests upon no visionary theories, conceived alone in the closet, or by some impracticable enthusiast. It aims at the establishment of no abstract principle, with no definite, practical bearing or application. It is not radical in its character or tendency; does not seek to overturn nor upturn any social, political or religious sentiment or institution; nor abrogate any constitutional or statute law.

Every person in every station, can do something to promote this reform; and every such effort, wisely directed, will increase the amount of his own individual enjoyment, and add to the aggregate enjoyment of the people of the whole Commonwealth.

Massachusetts has always been eminent among the American states. Her metropolis has ever been the metropolis of New England. Her example has been imitated and her influence has been felt, wherever the sons of New England are found, or the name of New England is known.

She established in the United States the first system for the public registration of births, marriages, and deaths, by which the personal history and identity, and the sanitary condition of the inhabitants, may be ascertained. She founded the first Blind Asylum; the first State Reform School; and aided in founding the first Deaf and Dumb Asylum; and her money, public and private, has flowed freely in the support of all the noble charities and religious enterprises of the age.

One of her sons first introduced into the United States the remedy of vaccination for the prevention of smallpox, which has deprived that terrific disease of its power, whenever used, and rendered its approach generally harmless. Another of her sons has the honor of making the great discovery of etherization, by means of whose wonderful capabilities the surgeon's instrument is deprived of its sting, and labor of its sorrow; the operator is permitted to pursue his work undisturbed while the patient remains passive, unconscious, and unmoved by the horrors which, without it, might be inflicted.

On the pages of her history are recorded the noble deeds which have given her a good name and rendered her glorious. But her people demand at her hands a more full enjoyment of life, and a more abundant diffusion of its blessings; and no more noble and honorable and glorious page can anywhere be found, than that which shall record the adoption of some simple but efficient and comprehensive plan of Sanitary Reform; by which the greatest possible amount of physical power may be produced, the greatest possible amount of physical suffering may be prevented, and the greatest possible amount of physical, social, and moral enjoyment may be attained. "This is the true glory which outlives all other, and shines with undying lustre, from generation to generation, imparting to its works something of its own immortality."

All which is respectfully submitted.

Lemuel Shattuck,
N. P. Banks, Jr.,
Jehiel Abbott,
Commissioners.

Boston, April 25, 1850

APPENDIX II

CHRONOLOGICAL LIST OF DATES RELATING TO PUBLIC HEALTH IN MASSACHUSETTS

1630 Recording of births and deaths begun in Boston.

1721 Smallpox inoculation begun by Zabdiel Boylston.

1797 Law passed authorizing local boards of health.
Householder to notify local board of health of dangerous diseases: smallpox specifically mentioned.

1801 Benjamin Waterhouse introduced use of "Cowpox Vaccination."

1809 Law passed requiring appointment of Public Vaccinators.

1827 Doctors required to report dangerous diseases.

1837 Public Vaccinator law repealed.

1846 First Vital Statistics Report for Massachusetts.

1850 Report of the Sanitary Commission by Lemuel Shattuck.

1855 Compulsory smallpox vaccination law passed.

1869 Law enacted creating State Board of Health; Dr. Henry I. Bowditch named chairman.

1871 In the "Offensive Trade" Act to regulate slaughtering, the Board of Health received its first executive power.
Reports of prevalent causes of illness and death from selected correspondents.

1873 First Annual Report of Boston City Health Department.

1879 State Board of Health given general supervision of all streams and ponds.
State Board of Health merged into State Board of Health, Lunacy and Charity.

1880 Dr. Henry Pickering Walcott elected Health Officer of Board of Health, Lunacy and Charity.

1882 First Food and Drug Law passed.

1883 Smallpox made reportable to Board of Health.
Manual of Health Laws first compiled (revisions in 1886, 1893, 1915, 1922, 1929, 1938).
Four chemists and two inspectors appointed to begin food and drug work.
Chemical work done in private laboratories.

1884 Massachusetts Drainage Commission formed.
Diphtheria made reportable.

1886 State Board of Health reestablished as independent agency.
Department of Water Supply and Sewerage established by State Board.

1887 Lawrence Experiment Station created by the State Board of Health.

1888 Board recommends establishment of State vaccine laboratory.

1889 Influenza outbreak.

1890 Formation of Massachusetts Associated Boards of Health.
First Trickling Filter.

1891 Food and Drug Laboratory established by the Board.

1893 "Dangerous diseases" made reportable (list did not include tuberculosis).
Lawrence Water Filter.

1894 Board undertook production and free distribution of diphtheria antitoxin.
Completion of main part of North Metropolitan Sewerage System.
Bacteriologic diagnosis of diphtheria by Worcester Board of Health.

1895 Bacteriologic laboratory services begun by Dr. Theobald Smith at Antitoxin Laboratory.
Circular of information about tuberculosis issued by the Board.
Massachusetts Hospital for Consumptives and Tubercular Patients authorized.
Report on Metropolitan Water Supply Study.
School Inspection in Boston.

1896 The Vital Statistics of Massachusetts—a Forty-Year Summary—in annual report.

1897 Diagnostic Bacteriology service begun in laboratory at State House.

1898 First medical inspector appointed.
First State sanatorium for tuberculosis in the United States opened at Rutland.

1899 W. F. Whitney's study of cancer authorized by Board.

1901 Widal test made available to State.
Board given powers to regulate shellfish industry.

1903 Report on value and application of coliform tests as index of water pollution.
Vaccine lymph production and distribution authorized.

1904 New building completed for Antitoxin and Vaccine Laboratory.
Completion of main part of South Metropolitan Sewerage System, then the largest water supply reservoir in the country.

1905 Systematic dairy inspection begun.
Ophthalmia neonatorum made reportable.
Completion of Wachusett Reservoir of Metropolitan Water System, then the largest water supply reservoir in the country.

1906 Monthly Bulletin issued.

1907 State inspectors of health appointed.
Tuberculosis made reportable.
Polio report issued.

1909 Typhoid carriers first recognized.
North Reading State Sanatorium opened.

1910 Silver nitrate furnished for eyes of newborn.
Emergency pasteurization put into use.
Westfield and Lakeville State Sanatoria opened.

1911 Slaughtering inspection transferred to State Board of Health.
Outbreak of septic sore throat (1200 cases).
First activated sludge experiments.

1912 Special investigation of poliomyelitis; monograph issued.
Typhoid vaccine production begun.

1914 State Department of Health supersedes State Board.
Systematic dairy inspection ceased due to law transferring this work to local Boards of Health.

1915 Division of Hygiene began its educational projects, and child hygiene activities.
State Wassermann Laboratory opened.
Two public health nurses, called "educators," appointed.
Manufacture of arsphenamine begun by Food and Drug Division.

1917 Framingham demonstration of community tuberculosis control.
Pneumonia study; disease made reportable.
Production of pneumococcic serum, Types I and II.
"Health Instructor in Foods" appointed.
Antitoxin and Vaccine Laboratory granted Federal License #64 authorizing manufacture and interstate sale of biologic products.
Harvard Cancer Commission volunteered to diagnose specimens of tissue suspected of malignancy.
Child Conservation Committee appointed by Commissioner.

1918 Venereal diseases declared dangerous to the public health.
Manufacture and distribution of arsphenamine.
Nursing assistants to District Health Officers appointed.
Influenza outbreak.
First toxin-antitoxin made at Antitoxin and Vaccine Laboratory.
"Commonhealth" a quarterly journal of general health information issued.

1919 Name changed to Department of Public Health; tuberculosis sanatoria taken over; leper hospital taken over.
First supervisor and first health instructor in mouth hygiene.
Fiftieth Anniversary celebration interrupted by Boston police strike.
First state appropriation for prevention and control of cancer.

1920 Division of Tuberculosis and Sanatoria joins control and treatment measures.
Measures for protection of mothers and infants inaugurated.

1921 Cape Cod Health Bureau started.
Leper Colony transferred to Carville, Louisiana.
School Hygiene Consultant and School Nursing Consultant appointed.

1922 First venereal disease social worker employed.
First Department radio program (over Westinghouse, Springfield).
Research on role of public health in water purification and sewage treatment started.

1924 Chadwick Clinics begun for the detection of childhood tuberculosis.

1925 Cancer survey undertaken.
Lakeville Sanatorium converted to treatment of extra-pulmonary tuberculosis.
Investigation of extent of contamination of tidal waters and authority to prevent taking of shellfish from contaminated areas, granted.

1926 Extension investigation of summer camp sanitation.
State cancer program, including Pondville Hospital, authorized.

1927 Hinton test devised to supplant Wassermann.
Investigations of cross-connection by Engineering Bureau.

Pondville Hospital opened; six cancer clinics organized.
Production of influenza bacillus anti-serum begun.
Medical social workers added to cancer and tuberculosis services.

1928 First shellfish purification plant at Newburyport.
Lee septic sore throat epidemic, followed by increased use of pasteurized milk.
Boston passed regulation requiring pasteurization or certification of milk; the first in Massachusetts.

1929 Division of Hygiene changed to Division of Child Hygiene, and Division of Adult Hygiene created.
Three-year Chronic Disease Survey started.
Weekly Report of Communicable Diseases.

1931 Pneumonia Control Project begun with Commonwealth Fund.
Berkshire and Nashoba Health Districts formed under grant from Commonwealth Fund.

1933 First extensive investigation of outdoor bathing places.
Industrial Disease Survey.
Appendicitis campaign started.

1934 First assistant engineer assigned to District Health Office.
State Health Commission appointed by Governor (Report in 1936).
Distribution of immune globulin begun.
"Contact", for school physicians and superintendents, issued.

1936 Social Security expanded Child Health Services.
Convalescent infantile paralysis cases admitted to Lakeville.
First crippled children clinic center established.
First sanitary health officer assigned to health district.
Massachusetts Associated Boards of Health changed to Massachusetts Public Health Association.
"Newsletter", a monthly or bi-monthly budget of news, information and announcements for boards of health and others interested, issued.

1937 Division of Genitoinfectious Diseases established.
Hospitalization of arthritis cases begun.
Cancer section opened at Westfield State Sanatorium.

1938 Western branch of Food and Drug Division opened.
Department given power to adopt rules and regulations regarding the control of communicable diseases.

1939 Mosquito survey conducted.
Approval of bacteriological and serological laboratories begun.
Law passed requiring blood test during pregnancy.

1940 Examination of industrial employees for tuberculosis begun.

1941 Production of normal human serum albumin begun as war research.
Hospital licensing begun.
Nursing bureau established.
Completion of Quabbin Reservoir of Metropolitan Water System.
"Sanitalk" for water and sewage works operation issued.

1942 Dental Unit established (Bureau in 1944).
Laboratory for Biological Assay of Vitamins established in Food and Drug Division at Westfield.

Production of immune serum globulin begun as war research.
"Laboratory Notes" for those in Laboratory Approval Program issued.
"Department of Public Health News" (For staff members) issued.
"Nursing News" for public health nurses issued.
"Cancer Tidings" for Cooperative Cancer Committees issued.

1943 District organization completed; field workers assigned to District Offices.
Emergency Maternity and Infant Care Program begun.
"Cancer Bulletin", for physicians interested in Cancer, issued.

1944 Nutrition Bureau established.
Immune serum globulin made generally available.
Bureau of Health Information established.
Established Bureau of Sanitary Inspection.
Supervision of district health offices and Bureaus of Dental Health, Nursing, Nutrition, Sanitation and Social Service taken over by Supervisor of Local Health Administration.
Speech Therapy first included in Services for Crippled Children.
Weekly Report of Communicable Diseases enlarged to include text as well as morbidity statistics.

1945 Division of Local Health Administration officially established.
Blood Derivatives Program begun.

1946 Division of Dental Health established.
New building completed for blood derivatives program.

APPENDIX III

MEMBERS OF THE STATE BOARD OF HEALTH

Name	Occupation	Service Began	Service Ended
Henry I. Bowditch	Physician	1869	1879
George Derby	Physician	1869	1874*
P. Emory Aldrich	Lawyer	1869	1872
William C. Chapin	Manufacturer	1869	1871
Warren Sawyer	Business	1869	1873
Richard Frothingham	Historian	1869	1879
Robert T. Davis	Physician	1869	1879
G. V. Fox	Lawyer	1872	1873
John C. Hoadley	Civil Engineer	1874	1879
Thomas B. Newhall	Business	1874	1879
David L. Webster	Manufacturer	1874	1879
Charles F. Folsom	Physician	1874	1879

MEMBERS OF THE STATE BOARD OF HEALTH, LUNACY AND CHARITY, COMMITTEE ON HEALTH

Name	Occupation	Service Began	Service Ended
Henry I. Bowditch	Physician	1879	1880
Robert T. Davis	Physician	1879	1884
John C. Hoadley	Civil Engineer	1879	1882
Alfred Hosmer	Physician	1881	1882
Thomas Talbot	Lawyer	1880	1884
George P. Carter	Business	1880	1883
Henry P. Walcott	Physician	1882	1883
John Fallon	Business	1882	1886
Edgar E. Dean	Physician	1883	1885
Charles E. Donnelly	Lawyer	1883	1886
Reuben Noble	Business	1883	1885
Samuel A. Green	Physician	1885	1886
Edward Hitchcock	Physician	1884	1886

MEMBERS OF THE STATE BOARD OF HEALTH

Name	Occupation	Service Began	Service Ended
Henry P. Walcott	Physician	1886	1914
Hiram F. Mills	Civil Engineer	1886	1914
Julius H. Appleton	Manufacturer	1886	1890
Frank W. Draper	Physician	1886	1901
Thornton K. Lothrop	Lawyer	1886	1890
Elisha M. Jones	Physician	1886	1893
James White	Business	1886	1887
Theodore C. Bates	Manufacturer	1887	1888
Joseph W. Hastings	Physician	1889	1894
John M. Raymond	Lawyer	1890	1892
Gen. Morris Schaff	Soldier	1891	1892

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* Service terminated by death

James W. Hull	Insurance	1893	1911
Gerard C. Tobey	Lawyer	1893	1911
Charles H. Porter	Insurance	1893	1911
Julian A. Mead	Physician	1895	1914
John W. Bartol	Physician	1902	1907
Robert W. Lovett	Physician	1907	1914
Clement F. Coogan	Business	1911	1914
Joseph A. Plouff	Lawyer	1911	1914
C. E. McGillicuddy	Lawyer	1911	1914
Milton J. Rosenau	Hygienist	1913	1914

COMMISSIONERS

Name	Year of Appointment	Year of Ending Service (as Com.)
Allan J. McLaughlin, M.D.	1914	1918
Eugene R. Kelley, M.D.	1918	1925*
George H. Bigelow, M.D.	1925	1933
Henry D. Chadwick, M.D.	1933	1938
Paul J. Jakmauh, M.D.	1938	1943
Vlado A. Getting, M.D. Dr. P.H.	1943	——

MEMBERS OF THE PUBLIC HEALTH COUNCIL

1914-1944

Name	City or Town	Occupation	Service Began	Service Ended
William T. Sedgwick	Boston	Biologist	1914	1921
George C. Whipple	Cambridge	Sanitary Eng.	1914	1923
Milton J. Rosenau	Brookline	Hygienist	1914	1915
William J. Gallivan	Boston	Physician	1914	1919
David L. Edsall	Boston	Physician	1914	1921
Joseph E. Lamoureux	Lowell	Physician	1914	1924
John T. Wheelwright	Boston	Lawyer	1915	1919
Warren C. Jewett	Worcester	Retired	1919	1925
Sylvester E. Ryan	Springfield	Physician	1920	1937
Roger I. Lee	Boston	Physician	1921	1934
Richard P. Strong	Boston	Physician	1921	1943
James L. Tighe	Holyoke	Engineer	1923	——
Francis H. Lally	Milford	Physician	1924	——
Gordon Hutchins	Concord	Engineer	(1926	1937
			(1940	——
Richard M. Smith	Boston	Physician	1934	——
Charles F. Lynch	Springfield	Physician	1937	1940
George D. Dalton	Wollaston	Physician	1937	1940
R. Nelson Hatt	Springfield	Physician	1940	1942
Cecil K. Drinker	Brookline	Physician	1943	1946
Elmer S. Bagnall	Groveland	Physician	1943	1945
George L. Schadt	Springfield	Physician	1942	1943
William H. Griffin	Boston	Dentist	1945	——
Charles F. Wilinsky	Boston	Physician	1946	——

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* Service terminated by death

DIVISION DIRECTORS

1915-1946

Division	Director	Began Service	Ended Service
Communicable Disease	Eugene R. Kelley, M.D.	1915	1918
	John S. Hitchcock, M.D.	1918	1919
	Bernard W. Carey, M.D.	1919	1923
	George H. Bigelow, M. D.	1924	1925
	Wolfert G. Webber, M.D. (Acting Director)	1925	1926
	Clarence L. Scamman, M.D.	1926	1931
	Gaylord W. Anderson, M.D.	1931	1937
	Roy F. Feemster, M.D.	1937	1945
	Merrill E. Champion, M.D. (Acting Director)	1945	1946
	Roy F. Feemster, M.D.	1946	——
Sanitary Engineering	Xanthus H. Goodnough, C.E.	1895	1930
	Arthur D. Weston, C.E.	1930	——
Division of Water & Sewage (Incorporated into Division of Sanitary Engineering in 1933)	Harry W. Clark	1915	1933
Food and Drugs	Hermann C. Lythgoe	1915	1946
	Carl S. Ferguson	1946	——
Hygiene	Selskar M. Gunn, C.P.H.	1915	1916
	Lyman A. Jones, M.D.	1916	1918
	Merrill E. Champion, M.D.	1918	1928
Maternal & Child Health	M. Luise Diez, M.D.	1929	1942*
	Florence L. McKay, M.D.	1942	——
Cancer & Other Chronic Diseases	Herbert L. Lombard, M.D.	1929	——
Biologic Laboratories	Milton J. Rosenau, M.D.	1915	1920
	Benjamin White, Ph.D.	1920	1933
	Elliott S. Robinson, M.D.	1933**	1942
	Geoffrey Edsall, M.D.	1942***	——
Tuberculosis & Sanatoria	William J. Gallivan, M.D.	1920	1921
	Sumner H. Remick, M.D.	1921	1925
	Henry D. Chadwick, M.D. (Acting Director)	1926	1927
	Sumner H. Remick, M.D.	1927	1929
	Alton S. Pope, M.D.	1930	——
Venereal Diseases	Nels A. Nelson, M.D.	1937	1941
	Ernest B. Howard, M.D.	1941**	1942
	John B. Hozier, M.D.	1942***	1944
	Harry G. Wyer, M.D.	1944***	1944
	George E. Perkins, M.D.	1944***	——

1915-1946

Local Health Administration	Roy F. Feemster, M.D. (Acting Director)	1945***	1946
	John J. Poutas, M.D.	1946	1946
	Robert E. Archibald, M.D.	1946	——
Dental Health	A. Lawrence Corbman, D.D.S. (Acting Director)	1946	——

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* Service terminated by death
** Military Leave
*** Military substitute

STATE DISTRICT HEALTH OFFICERS

Name	Year of Appointment	Year of Ending Service (as D.H.O.)
Frank L. Morse, M.D.	1915	1915
William H. Coon, M.D.	1915	1915
Lewis Fish, M.D.	1915	1916
Lyman A. Jones, M.D.	(1915	(1916
	(1918	(1927
William W. Walcott, M.D.	1915	1917*
Merrill E. Champion, M.D.	1915	1918
John S. Hitchcock, M.D	1915	1918
Adam S. MacKnight, M.D	1915	1918
Charles E. Simpson, M.D.	1915	1925*
Stanley H. Osborn, M.D.	1916	1917
Arthur A. Brown, M.D.	1916	1919
Francis E. Finnegan, M.D.	1916	1922*
Howard A. Streeter, M.D.	1917	1919
George T. O'Donnell	1917	1927
Russell B. Sprague, M.D.	1918	1919
Charles W. Milliken, M.D.	1918	1924
James W. Keenan, M.D.	1919	1920
Bertrand E. Roberts, M.D.	1919	1920
Oscar A. Dudley, M.D.	1919	1944*
Harold E. Miner, M.D.	1920	1936*
Leland M. French, M.D.	1922	1929
Richard P. MacKnight, M.D.	1924	1938
Edward A. Lane, M.D.	1927	1929
George M. Sullivan, M.D.	(1927	1929
	(1934	1935
Wilson W. Knowlton, M.D.	1929	1930
Charles B. Mack, M.D.	1920	1937*
Frederick S. Leeder, M.D.	1930	1931
Robert E. Archibald, M.D.	1930	1946
Walter W. Lee, M.D.	1931	——
Henry M. DeWolfe, M.D.	1935	1943*
John J. Poutas, M.D.	1936	1940
Harold W. Stevens, M.D.	1936	——
Charles E. Gill, M.D.	1937	1939
	1940	1942**
	1946	——
Frank B. Carroll, M.D.	1938	1941
Ernest M. Morris, M.D.	1940	1940
Vlado A. Getting, M.D.	1941	1942
Morris Taylor, M.D.	1941***	1942
Nicholas Fiumara, M.D.	(1942***	1943**
	(1946	——
A. Daniel Rubenstein, M.D.	1942	——

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* Service terminated by death

STATE DISTRICT HEALTH OFFICERS (continued)

Name	Year of Appointment	Year of Ending Service (as D.H.O.)
Arthur E. Burke, M.D.	1943***	——
Harry G. Wyer, M.D.	1944***	1946
James W. Knepp, M.D.	1945***	1946
Robert E. Ober, M.D.	1946	——
Walter J. Pennell, M.D.	1946	——
Paul Richmond, Jr., M.D.	1946	——

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* Service terminated by death
** Military Leave
*** Military substitute

SUPERINTENDENTS OF SANATORIA

1920-1944

	Service Began	Service Ended
Rutland		
Ernest B. Emerson, M.D.	1920	1944
Paul Dufault, M.D.	1944	——
Lakeville		
Sumner Coolidge, M.D.	1920	1924
Leon A. Alley, M.D.	(1924 (1945	1941** ——
Claire W. Twinam, M.D.	1941***	1943
Arthur Kanserstein, M.D.	1943***	1943
Donald A. Martin, M.D.	1943***	1945
North Reading		
Carl C. MacCorison, M.D.	1920	1944
Claire W. Twinam, M.D.	1944	——
Westfield		
Henry D. Chadwick, M.D.	1920	1929
Roy Morgan, M.D.	1929	1946
Donald A. Martin, M.D.	1946	——
Pondville—established in 1927		
Lyman Asa Jones, M.D.	1927	1929
George M. Sullivan, M.D.	1929	1934
George L. Parker, M.D.	1934	——

Publication of this Document Approved by the State Purchasing Agent
5m-5-47-21097